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— Book 1

SRA
MATHEMATICS
LEARNING SYSTEM TEXT

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Canadian Publication

MATHEMATICS LEARNING SYSTEM

The Canadian publication of *Mathematics Learning System* is completely metric.

On all pages where coins appear, suitable revisions have been made in the pupils' textbook for Canadian use. However, these do not affect the teaching of the program.

Metrication does not affect Level 1, because at this level the pupils are not dealing with units of measurement. At all later levels, metric units are introduced and used throughout the program.

Teacher's Guide
Level 1 Book 1

SRA MATHEMATICS LEARNING SYSTEM TEXT

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SRA

SCIENCE RESEARCH ASSOCIATES, INC.
Chicago, Palo Alto, Toronto
Henley-on-Thames, Sydney, Paris

A Subsidiary of IBM

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Printed in the United States of America

2468845

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• Locations of schools that participated in the second year of prepublication testing. They verified the revision of the first year's materials.

★ Locations of authors of the SRA MATHEMATICS LEARNING SYSTEM

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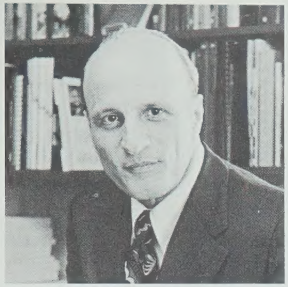

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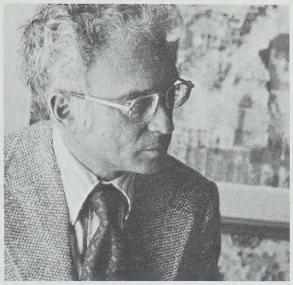

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Thank You

Science Research Associates, Inc., and the authors want to say THANK YOU to a group of people who helped tremendously in the development of this system. The whole thing started way back in 1969.

Juanita Tolson, experienced public school and college educator in Washington, D.C., and J. Fred Weaver, author and professor at the University of Wisconsin, were asked to review SRA's existing basal mathematics program, tell us bluntly what was wrong with it, and recommend what should be in the next basal series. They did. We listened.

Jeremy Kilpatrick, Columbia University Teachers College, was asked to share his knowledge of problem solving in elementary mathematics and tell us what could be done to improve problem-solving materials. This was a hard job. He tried. We tried.

Classroom teachers Norma Jean Cheek, Joy Craig, Fran Engelbrecht, and Jane Hawley tried out new ideas before manuscript was prepared for field testing.

John C. Egsgard, well-known Canadian educator, helped us think through the best way to develop the geometry strand so that applications would be natural and valid. He brought to our attention the outstanding work done by the Ontario Institute of Curriculum Studies and unselfishly shared his own thoughts and efforts.

George T. Duncan, University of California at Davis, was asked to do a huge job: to construct the probability and statistics strand for the entire program. His approach was refreshingly simple and understandable. It's not every day that you can find a specialist in this area who can have empathy for the young child and his thinking process and yet handle the subject with expertise.

Jerome D. Kaplan guided the work of gifted educator-writers from Educational Analysis and Evaluation, Inc., who prepared some of the chapters.

Irving Morrisett, of the Social Science Educational Consortium, was asked to react to an approach involving economics. He said don't. We didn't.

Teachers from the Montreal Catholic School Commission and William Bober, supervisor of mathematics for the Edmonton Catholic School Board, tackled the huge job of reviewing all of the final, revised manuscript used in the verification study. Their efforts gave us still more information to consider as the pages received their finishing touches.

The Mary Beck School, Elkhart, Indiana, put the verification-study materials into their nongraded, personalized education structure. They gave us insight into the various management techniques that could be used with these materials. Charles Walker assisted us from an administrator's point of view. Leo Anglin, consultant in the developmental tryout, transferred his efforts and enthusiasm to the verification study.

Ralph W. Tyler, trustee and director emeritus of the Center for Advanced Study in the Behavioral Sciences, has given generously of his time and ideas to the people directly responsible for developing this program. His knowledge of today's problems and his dream of tomorrow's education encouraged us every step of the way.

We couldn't possibly find the right words to thank all the people in the developmental field-study schools who worked so hard and responded so honestly throughout 1971 and 1972. It's hard to tell who was the most blunt, the 75 teachers or the 2700 kids. They told us what was wrong—and what was right.

The information from nearly 700 teachers and 20,000 students in schools throughout the United States and Canada who participated in the 1972/73 verification study gave confidence that the revision of the first year's testing was effective.

Other teachers dug into their bag of tricks and contributed tried and tested classroom activities. Many thanks to James K. Bidwell, Philip Cox, Thomas S. Davis, Frances Greenberg, Muriel Greig, Bettye Hall, Donald Kamp, Evelyn Kozar, Kay Nebel, David O'Neil, Louise Petermann, Madolyn Reed, William Swart, and Judy Tate.

Literally hundreds of people in SRA have shared in the development of the SRA MATHEMATICS LEARNING SYSTEM. They all cared enough to do their very best. The editorial staff did even more. Special thanks to those exceptionally talented and dedicated people.

Preface

How was the SRA MATHEMATICS LEARNING SYSTEM *developed?* Writing was almost the last step. We started by listening.

We visited schools of all kinds, from the inner city to remote rural areas. We sat in classrooms. Teachers, children, and parents told us about what they liked and didn't like about math programs.

We asked an independent research organization to interview supervisors and administrators. We talked to SRA Staff Associates about the needs they saw.

We reviewed all major basal math series. We studied standardized tests to see what children might be expected to know at various ages. Consultants evaluated existing SRA programs.

We also analyzed recommendations and reports from curriculum study groups, state and city adoption committees, and researchers in a variety of fields.

Then our authors, editors, and consultants worked together to prepare the rationale and learning objectives for the SRA MATHEMATICS LEARNING SYSTEM. Writing of the program did not begin until the entire scope and sequence had been defined by the learning objectives.

The manuscript was continuously reviewed, discussed, and revised by our development team. But it's arrogant for adults to sit in an office and predict what will work in the classroom. We needed answers to three questions:

- Will pupils attain the objectives?
- Will pupils develop positive attitudes toward the program?
- Will teachers find the program easy to use?

Our next step was to undertake two years of prepublication tryouts. We carefully selected classrooms across the United States and Canada to represent the broad range of pupil abilities, family backgrounds, and teaching styles. We visited, surveyed, listened, and tested. We rewrote and revised and retested before going to press with the program you see today.

We're confident that you'll find the SRA MATHEMATICS LEARNING SYSTEM effective, enjoyable, and easy to use. One of our tryout pupils wrote:

I liked the program and nothing was hard or dificalt. I think the book should come out to the world.

What makes the SRA MATHEMATICS LEARNING SYSTEM *a "system"?* The word *system* has many definitions. We call the SRA MATHEMATICS LEARNING SYSTEM a system because of the following five characteristics:

1. The entire program is based upon well-defined learning objectives.
2. Although the program can be enriched in many ways, the texts are complete in themselves. The teacher is not required to use any other materials.
3. There is a comprehensive evaluation program in each text.
4. Learning alternatives are provided for teachers and pupils who wish to use them.
5. The program provides information about the learners that will guide the teacher in altering or expanding a learning sequence.

What kind of objectives are there? Objectives are given for each chapter. Key to the program, however, are the year-end mastery objectives. These are the goals toward which instruction is directed.

Distinguished educator Ralph Tyler helped with the difficult task of defining learning objectives. He told us: "Remember the purpose of objectives. They are to guide, not dictate. Think of them as goals to be reached as a result of the teaching-learning process.

"Keep the number of objectives for any level under thirty, if possible. The teacher should be able to remember them all. A teacher who has to search through hundreds of objectives to figure out what to do cannot be free to teach anything more than bits and pieces.

"Avoid fashionable formulas for writing objectives. Fashions change. Avoid jargon. Keep the language simple. Objectives have to say something or their value is lost."

I liked the whole book because it told me things that I didn't even know about and it was very interesting.

What are the texts like? The SRA MATHEMATICS LEARNING SYSTEM focuses on the real world and develops many concepts from real-world situations.

Compared with other programs, this program spends a longer time on an idea and its related skills before introducing another topic. This gives skill competency a better chance to develop.

I like the S.R.A. math book because it's not just plane old 5 x 3 it you can gives you more time to think.

There are many invitations for pupils to *think* as well as to do. Not all questions are meant to be answered. Some questions have many answers; some have none.

I liked this section. They had fun math sentences And they made you think. Math is getting a lot eazer and its funner to, math really is fun

The language is informal. Purists may object to this departure from standard textbook English, but our tryout pupils responded enthusiastically to the style. Instead of stressing technical vocabulary and symbols, the program emphasizes skills and nonverbal understanding.

No pupil should have to moan, "Aw! It's the same old stuff," when he flips through his math book. The pages of the SRA MATHEMATICS LEARNING SYSTEM are varied. They're lively. They look like fun.

How are the texts organized? There are three major types of chapters.

Exploratory In an exploratory chapter pupils play with a big idea, think about it, and share their own ideas. The necessary vocabulary is introduced, along with some of the notation and operations related to the major idea.

Instructional In this type of chapter pupils begin the serious business of acquiring skills. Ideas are carefully sequenced into learning steps, and each learning step is accompanied by practice.

Review Here pupils must demonstrate understanding and skills. There is a review of the learning sequence, along with opportunities to explore applications.

No one text contains all three types of chapters for a single concept strand. For example, there are exploratory and instructional chapters on addition of whole numbers in level 1. The instructional chapters continue through level 4, and the review chapters start at level 5.

How are pupils evaluated? The evaluation program is built into each text. It allows a learner to check his own progress and determine his own strengths and weaknesses.

The first pages of an instructional chapter contain an informal survey to find out what the learner knows about the chapter to come. These pages indicate what the chapter is about, and they help to define the learning goal of the chapter.

The tests within an instructional chapter are called Progress Checks. A Progress Check identifies the knowledge that is a prerequisite for further work.

After learning from your math book I found this test very easy I found it easy because I learned from your book this is what made it easy.

A Progress Check can serve two functions:

1. If a pupil has gone through the preceding instructional pages, a Progress Check tells whether or not he has acquired the appropriate knowledge and skills. If he hasn't, he should try other kinds of instruction.
2. If a pupil seems to have prior knowledge of the chapter, as indicated by the survey at the start of the chapter, he may go directly to the Progress Check. It will determine if the preceding instructional pages can be skipped. If he's not successful on the test, he simply goes back to pages he skipped.

At the end of every chapter a Checkout lets the pupil and teacher know whether the learning objectives of the chapter have been reached.

What learning alternatives are there? There's a limit to the number of pages in a textbook. Beyond a certain length the book becomes too expensive and hard to use. So only a few pages can be devoted to extras for pupils who need more help or who would benefit from additional activities. To make sure these important extras are available, we've supplied a wealth of reinforcement and extension activities in the Teacher's Guides.

The SRA MATHEMATICS LEARNING SYSTEM *was built on some simple convictions.* Mathematics is relevant and vital. It's useful and interesting. Everyone should relax and enjoy it.

I like math alot more than I did last year.

Some of the greatest learning opportunities are found in everyday things and are discovered when people talk together.

I liked the chapter because I think we learned the most and because we had a lot of discussions.

Mathematics doesn't have to be formal and abstract to be good mathematics.

I think this math is very good because I know what I'm doing

Everyone—students and teachers—should succeed in mathematics.

I liked it very much I never learned this kind of measures but I think it is good that you wrote it in the book because soon America will learn ~~to them~~ a new kind of measure and you already are teaching it to us.

A textbook can't transmit the joy of learning as well as an enthusiastic teacher, but it can help.

Notes & Things

You will see a page that looks like this at the start of each new chapter. It's an overview of the math ideas to come and a listing of the things you will want to have on hand for the lessons. Let this page be an overview.

The children have some big jobs to do this year. They will learn what each of the numbers from zero to one hundred means. Just plain rote counting won't get that job done. They will learn that addition is the action of bringing things together and that there are symbols that can be used to show that action. They will learn about the take-away action of subtraction and also that subtraction can be used to compare things to find out how many more one person has than another has. They will learn the addition facts and some of the subtraction facts.

They will find out what those funny numerals $\frac{1}{2}$ and $\frac{1}{4}$ mean and will have lots of experience with the shapes of objects in their world. And as a bonus, they will find out how big folks measure things. Wow! That is a lot to learn.

This material has been called a gentle program with high expectations. The most important feature of any book is that there is time to explore, study, and come to some point of understanding and skill before going on to the next idea. In this before going on to the next idea. There is time and opportunity for success.

The children will need you to guide them every day. They will have lots of chances to show off how much they have learned and will look to you for help when they discover things they need to work on some more.

This guide is a simple book. Each pupil page appears in the guide exactly as it does in the pupil book except that it is slightly reduced in size. The answers are in place right where they should be.

You will find the following information in the margin beside each pupil page:

lesson The pages indicated here are related but need not all be presented on the same day. They provide the continuity of experience necessary to get an idea established.

goal The words needed to turn this goal into a behavioral or performance objective have not been printed, although they could have been. The line simply helps you pinpoint the learning task for the page.

memo You won't see this entry very often but when you do, please take time to read it. Sometimes you are warned about a potential problem, or there's an explanation of why something is done the way it is, or it may be simply a suggestion to make your work a bit easier.

things All the materials that you'll need to follow the suggestions for the page are listed here.

warm-up You can guess where this label came from. If the math idea is a new one or maybe a hard one, a suggestion is made that will help get the learners ready to learn.

page 1 This tells only one way to deal with the page. You may have a much better idea or a way of handling the page that is just right for your style of teaching. If so, do your own thing.

As you flip through the pages you will see a lot of sentences in *italic type*. These sentences are intended to give you some ideas about the words you might use to talk about the page. (How many times have we all thought, "I understand, but I don't know what words to use to explain it"?) In talking, probably nobody would use the exact words that are given. They are not meant to be a script. Sometimes the questions won't even be right for your group. They are offered as a guide, nothing more.

You will find the new concept-development words in SMALL CAPITAL LETTERS, and some other functional words that deserve emphasis will be **in this kind of type.**

Now flip through the book again. Notice the copy below the pupil pages. There are 3 types of activities. Each type has its special symbol.

The old familiar red *stop* sign will signal an activity for the youngster who simply needs more work before he goes on.

The yellow *divided highway* sign signals an activity for those youngsters who can accept a challenge beyond the learning expectations of the page.

The new, blue *rest area ahead* sign signals an activity you can use with any group. This type of activity departs from the standard math work and gives everyone a chance to have some fun.

Here you will find the ideas that will extend the lessons and suggestions that offer specific help for those children who need it. Each activity was carefully selected so that you could have something special to personalize each child's learning. These activities rarely require unusual equipment and most of them are enjoyable as well as helpful.

You'll find a Resource Section at the end of each chapter. This provides alternate forms of all progress checks and the checkout, still more activities, and you will usually find references to additional learning aids that are correlated to specific chapter objectives. At the end of each guide book you'll find a description of the other learning aids, and a bibliography that lists children's books and film medium references. These features were planned to help you with your job of teaching and the children's job of learning.

The Teacher's Guide is split into two volumes. Teachers told us they didn't like to carry a big book around all year; the spiral-wire binding snagged a lot of clothing; and it was really a great feeling to complete a book (even though there was another one to follow). It made sense to us. Hope it does to you.

Another request was to have the guide page numbered the same as the pupil page. That was not such an easy request to handle, since there are teacher resource pages at the end of each chapter and some pages of introduction to the next chapter. But that request made sense too, so we put the alphabet to work.

Suppose the first chapter in the pupil book ends on page 38, the Teacher's Guide resource material fills two pages at the end of the first chapter, and two more pages contain the introduction to the next chapter. The page numbers in the guide would go like this: 38 is the last page of chapter 1 pupil material; the first page of the teacher's resource section is 38a; the second page is 38b. The pages of introduction to chapter 2 continue in the same way. The first page is 38c; the second is 38d. Finally we are back to the first page of the next chapter in the pupil book. It is numbered 39 and so is the guide page. It won't be so bad once you get used to it.

As a teacher, you are always trying to find a way to record a pupil's progress and to report this progress to the child's parents or to his next teacher. So at the end of the second guide, on pages 256d and 256e, you will find two forms that you are free to remove and reproduce as is, or adapt the form if you like.

here is a suggestion

The manipulation of real-world objects will help motivate children to learn. There are very few store-bought manipulatives that are better than the "junk" that can be collected. The bonus is that the junk is part of the child's world. You may want to plan ahead and start collecting some of the things you will want later in the year. Members of your class will love to help you.

The managers of the grocery store and variety store, as well as the druggist, will save all sorts of boxes, trays, and other containers for you.

Determine the storage space in your room. Get at least two large boxes to start with. Mark them MEASUREMENT and SHAPES. You won't need everything on these lists, but what a joy it is to have extra stuff available to challenge the learner's thinking.

measurement box

calendars—clocks beyond repair, but with hands that still turn—clock measuring tape—cord, string, or rug yarn—measuring cups—metresticks—milk containers—ribbon—rulers—some kind of scale

shapes box

boxes of all sizes and shapes (butter, cereal, hosiery, facial-tissue, gift, paper-clip, and so on)

related flat rectangular and square shapes (floor tile, cardboard, paper trays, old playing cards, and so on)

cylinders of all sizes (tin cans, plastic bottles, baby-food jars with covers, plastic food containers, paper cores—from rolls of waxed paper, toilet tissue, paper towels—and so on)

related flat circular shapes (plastic lids from pet-food and coffee cans, coffee filters, paper coasters, paper plates, and so on)

And you will want some plastic baskets like the ones strawberries come in as well as different-sized balls, some balloons, cone-shaped paper drinking cups, and many scrap pieces of lumber.

Maybe you will want another box for supplies such as adding machine tape—index cards—magazines—mail-order catalogs—newspapers—plastic or paper bags—rolls of wall paper—sorting trays (TV-dinner trays or the divider trays used in shipping citrus fruit, for example).

Use plastic food bags to bunch similar items such as beads—blocks—bottle caps—buttons—clothespins—coffee stirrers—dried beans—drinking straws—hard-shell nuts (acorns, chestnuts, pecans)—pebbles, rocks, or shells—pinecones—pipe cleaners—plastic-foam packing chips—plastic spoons—tongue depressors—toothpicks—shelled corn—wrapped hard candies. These bags will also serve as counters.

It's O.K. if you don't have time to start your junk boxes now. There will be fair warning to you at the beginning of each chapter where you will need specific items.

here is another suggestion

Involve the parents at the start of a learning period. This can have some real advantages.

1. Parents will feel that they are part of their child's learning process if the objectives can be stated in a meaningful way.
2. Most parents are eager to help but many times do not know what to do. It is easier to enlist their aid to prevent problems than to have them work with their child after a problem arises.
3. If objectives are presented in advance, reporting progress will be much easier. In fact, parents will have evaluation techniques that they can use themselves.

Model letters will be presented in the Resource Section periodically throughout the guide.

You will of course want to adapt them according to your style and perhaps modify them so that the priorities of your school's curriculum become more obvious.

In the interests of prose style, we've referred to the learner as "he." You may want to have two letters—one for boys and one for girls. Talk over the letter idea with your supervisor and fellow teachers before you send the first one home. Be sure it is a practice you're willing to continue. Most parents will like the letters so much that they'll want an explanation if the letters stop coming.

This first model letter covers the work done in the first two chapters, pages 1 through 52.

letter to parents

Dear Parents,

We are getting ready to study mathematics. We will start with the numbers 0 through 6.

Most youngsters know how to count to six, but we want to make sure everyone understands what each number means and how to write each of the numerals.

Your child probably knows which person has more cookies, or pieces of candy, or baseball cards, but we want to make sure that he can compare two numbers and tell which is greater, which is less.

Your child will also be looking for mathematics in the real world by comparing the sizes and shapes of boxes, cans, and other everyday things

You can help a great deal. Now it can be your turn to ask questions. Ask "How many?" when you unpack the grocery bag, look in the new-car showroom or see people walking down the street. Have your child count the dishes, silverware, glasses, cups, and the napkins for the table. Other experiences with number, shape, and size are provided by ordering hamburgers at the drive-in, watching someone measure things, and helping get cans or boxes into the grocery cart. All these things will show that we use the ideas of math every day in school and at home.

There are some other good questions you can ask too. "Which is larger?" "Which is smaller?" "Where do you see it?" "What is it shaped like?" "Is it to the right or to the left?" These same questions will be asked in the classroom.

Together we can make mathematics have real meaning and we'll be off to a good start.

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other learning aids
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OBJECTIVES

Content objectives have been a part of instructional programs for years. Recently there has been an increased emphasis on being more specific about these objectives. Performance, instructional, educational, and behavioral objectives can be defined quite differently from one another, but there is little agreement as to a single definition for each kind. There is agreement about the purpose of objectives, however. This program was built upon learning objectives. Each objective clearly states what pupil behavior is to be observed, the conditions under which the pupil is to perform, and the criteria for acceptable performance.

These learning objectives by definition are limited to observable behavior; therefore they are automatically limited to the cognitive domain. This is a severe limitation, for the field-test information reveals that the affective domain also has been penetrated.

Increased pupil awareness of mathematics in the everyday world has been reported again and again. A greater pupil involvement in things relating to mathematics has been shown in the complete range of abilities. Attitudes have been changed. But writing objectives for the affective domain is a new endeavor, and frankly we have not yet mastered the art. The following, therefore, are learning objectives in the cognitive domain. Each objective states the performance expected at the completion of the first-level materials.

whole-number concepts

1. Given a set of from 0 to 100 members, the learner can count, say, and write the number of members in the set.
2. Given any two numbers from 0 to 100, the learner can compare the numbers by saying "more than," "less than," or "equal to."
3. Given orally the ordinal number (first, second, . . . , tenth) of a member of an ordered set of not more than ten the named member; given a specific the member; given a specific member of the set, the learner can say its ordinal name.

whole-number notation

1. Given any one of the numerals 0, 1, 2, 3, . . . , 100, the learner can read it aloud; given any one of these numerals aloud, the learner can write it.
2. Given a number of tens and a number of ones, the learner can write the corresponding numeral.

whole-number operations

1. Given an addition number fact written in horizontal or vertical form, the learner can say and write the sum.
2. Given any two numbers with a sum less than 100 requiring no renaming, the learner can find their sum.

geometry concepts

1. Given a set of objects such as boxes, cans, and balls, the learner can sort them according to their likenesses and differences.
2. Given objects such as boxes, cans, and balls, the learner can find flat surfaces and curved surfaces.

measurement

1. Given two objects with different lengths, the learner can identify the longer or the shorter object.
2. Given an appropriate but arbitrary unit of length, the learner can find the number of whole units in the length of an object.
3. Given two objects with different weights, the learner can identify the heavier or the lighter object.
4. Given a penny, nickel, dime, or quarter, the learner can identify it and give its value.
5. Given a clockface, the learner can tell time to the hour.

1 NUMBER CONCEPTS 0-6

before this chapter the pupil has—

1. Had experience with matching objects
2. Had language experience that includes over-under-between, inside-outside-on, to the left/right, above-below, first-next-last, taller-shorter, larger-smaller, bigger-littler
3. Had experience with rote counting

in chapter 1 the pupil is—

1. Comparing sets by matching
2. Telling which sets match, which set has more, which set has less, which set has the most
3. Developing number concept for zero through six
4. Writing how many in sets of zero through six
5. Matching numerals with the appropriate set for zero through six
6. Recognizing the number that comes before, after; that is one more, one less
7. Ordering the numbers 0 through 6
8. Recognizing the positions first, second, next, last

in later chapters the pupil will—

1. Count, say, and write the number of members in a set of zero through one hundred
2. Compare two numbers from 0 through 100 by saying "more than," "less than," or "equal to"
3. Read aloud and be able to write any one of the numerals 0, 1, 2, . . . , 100

Notes & Things

It is hard to determine how much knowledge of mathematics a child will have that first day of school. You will notice that this book makes very few assumptions about prior knowledge. The first days of school are filled with getting to know one another. Let this also be a time to get to know each child's past experience and understanding of mathematical ideas. There is no rush. Regular progress checks will help you decide which groups are ready to move more quickly and which need more time to explore an idea further.

This chapter deals with the concepts of the numbers zero through six and how those numbers can be recorded. You will notice a decreased emphasis on the numeral-number distinction because the numeral is always written to record how many. If you have found the numeral-number distinction especially helpful, please continue to use the idea. There is nothing on the pages that will hinder you.

You should also be prepared for a decreased emphasis on set concepts. Some of the language is used, but the notation is not. Once again, if you have found good ways to aid the learner's understanding with a greater emphasis on sets, please continue using the techniques.

words

Concept-development words and phrases used in this chapter are listed in columns in the order in which they are orally used with the pupils. Those words that also appear on a pupil page are marked with *.

sets*	two	more than
match*	most	less than
row	first*	four
as many as	second	before
same number	three	after
less*	next	column
more*	last	five
one	zero	greatest number
numeral	none	least number
how many*	one less	order
one more*	least*	six

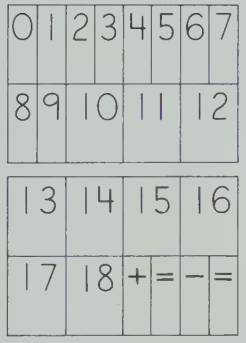
things

Index cards. (5″ x 8″ is a good size). As each number is developed, the pupil is asked to make a concept card that shows a set with that number of objects. For this chapter you will need at least seven times as many cards as class members. You'll need more later, so get a good supply. You could cut oaktag if you prefer. These cards will get a lot of use, so make sure that the paper is sturdy.

Counters. You will need only 20 for each pupil now, but you'll need more for later chapters.

Ten-trays. The least expensive, easiest to find, quietest ten-tray is an egg carton with the lid and two end cups cut off. Everyone will need one for now but more for later chapters. You won't have any trouble collecting these.

Numeral cards. Two spirit masters will save a lot of time. Divide the master in half. Measure lines 3 cm or 6 cm wide according to the sample. Position the numerals in the top half of each section. Each pupil will need a complete set of



numeral cards eventually. Your flannel board and felt pieces will be used too.

Your junk boxes will come in handy for the extra activities:
At least 7 baby-food jars with covers
Cubes for game pieces that are made by labeling each face with a given special set of numerals
Old magazines

name _____

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PURPOSE: Survey what the child knows about numbers.

lesson Pages 1, 2, 3

goal **Survey** – vocabulary and ability to count from 1 through 9

page 1 *What do you see?*

Listen to children's words as they describe what they see. Do they tell how many? tell location? describe color? compare size? Children who use numbers and can describe location indicate they're ready to move faster than the others.

If the children are shy, check words such as larger, smaller, more, less, most. Get them to tell you where each set of objects is located. Listen for words such as inside, next, right, left, between. Ask how many. There are up to 9 objects for them to count.

Children may mark the page in any way you choose in order to indicate comparison, position, or counting.

Develop comparison and position vocabulary with real-world examples. Compare the heights of 2 children, the sizes of 2 or 3 books, the lengths of several pieces of chalk.

Hunt for a hidden object. Have the finder describe its location – on top of a desk, under a chair, inside a bottle, to the right of the door, between 2 books, at the bottom of a box.

goal Comparing sets that match

warm-up Find out who knows the words SETS and MATCH.

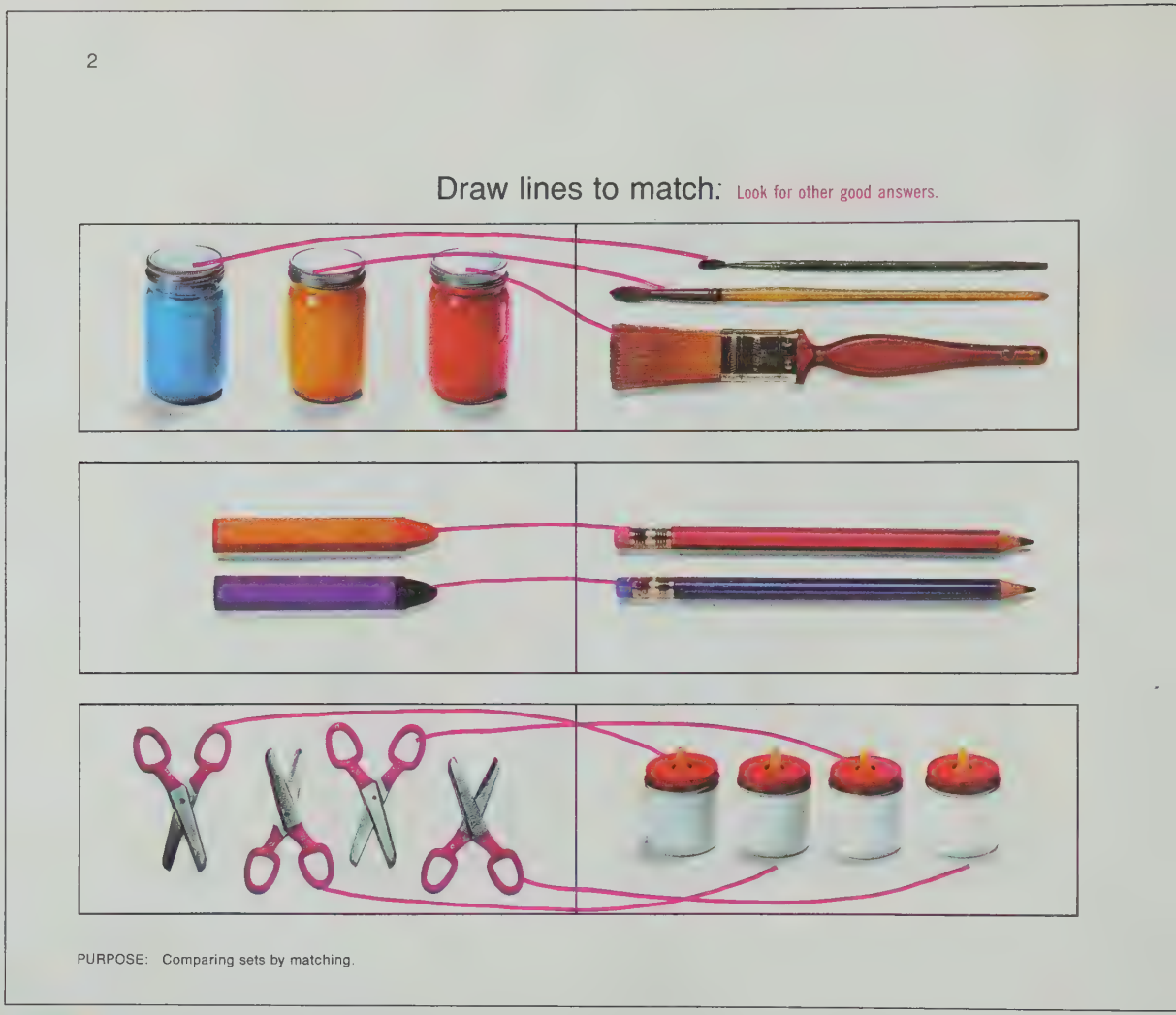
What kinds of things come in sets? What do you think a set is? Work toward the generalization that a set means a group of things.

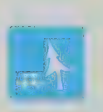
Call a set of 5 children to the front. Give each child a book. Ask if there are as many books as people. Pull up 3 chairs. Ask if there are as many chairs as people. Pull up 2 more chairs. Now is there a chair for each person? Repeat with more sets that match.

page 2 Introduce ROW. (Rows go across the page.)

Look at the top row. What do you need when you paint? Is there a brush for each paint jar? How can we be sure?

Ask how to show matching. Some child will come up with the idea of **drawing lines** to match. Continue to ask if the sets match and why. The key phrase is AS MANY AS. There are as many brushes as paint jars; therefore the sets match.

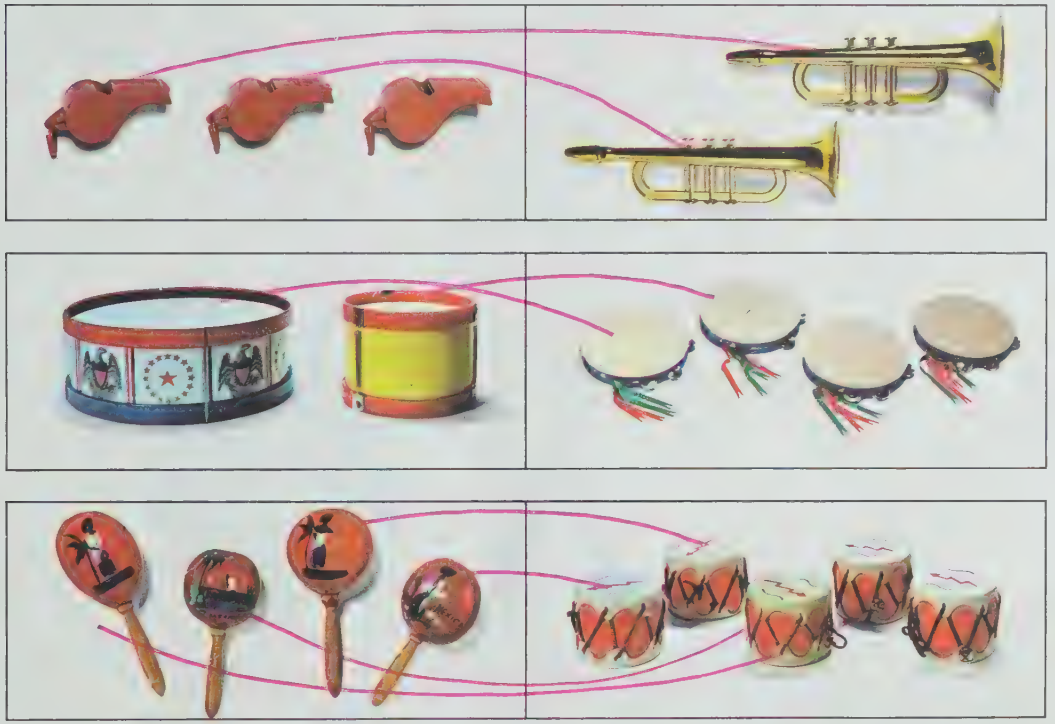




Develop the concept of matching by thinking aloud each time you distribute supplies: *I wonder if I have enough. How can I find out?* Sometimes you should have too few materials, other times too many. Have children distribute the supplies.

name _____

Draw lines to match. Look for other good answers.



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PURPOSE: Comparing sets by matching.

goal Comparing sets that do not match

page 3 *What do you see in the top row?*

Draw lines to match the whistles and horns. Do the sets match? How do you know? Does one set have MORE*? Which one? Which set has* LESS*?*

Complete the page with similar questions. Watch for pupils who have trouble finding the set that has less. They need additional practice with real objects.

STOP

Pair children. One holds up a number of fingers. The other holds up the same number (but not necessarily the same fingers). Touch fingers to match. New rules: The partner holds up 1 less finger. Match to make sure. New rules again: The partner holds up 1 more. Match to make sure. Change roles after a reasonable amount of practice.

lesson Pages 4, 5

goal Development of the concept of one

things different objects for making sets of one

warm-up Guessing game

I'm thinking of a set of ONE. *Can you guess the set I am thinking of? That's a set of one but not my set.*

Continue until someone guesses the set. That person gets to think of the next set.

page 4 Examine the picture.

Is there a sun in the sky? How many? How many boys in the picture? How many fishing ponds?

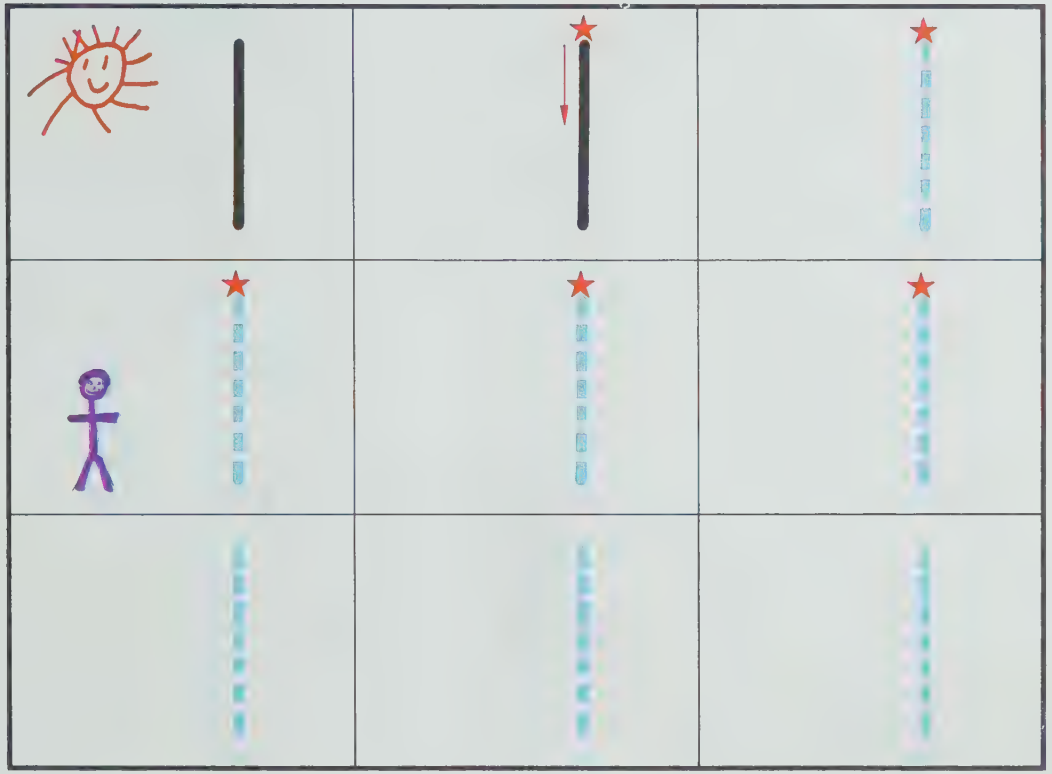
Name more objects and have the pupils draw. *How many fish in the pond? Put one fish in the pond. . . . That one sun sure looks hot. Give the boy one hat. . . . It's still too hot. Put one tree in the picture. . . . Do you think that one boy can catch one fish? Let's see. Give him one fishing pole and one hook at the end of the one line.*

Continue to have many single objects added to the picture.

PURPOSE: Introduction to one.

Now is a good time to play Simon Says.
Simon says, "Show 1 finger."
Simon says, "Show 1 arm, show 1 book, 1 pencil. . ."

name _____



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PURPOSE: Introduction to and writing of the numeral 1.

goal Writing how many in a set of one

memo On these first pages, the numeral should not be written unless it is used to record HOW MANY. Be sure that the pupils know the meaning of **star** and **arrow.**

things for each pupil:
5″ x 8″ index card
numeral card for 1

page 5 Point to the first box. *Do you see a sun? How many?* Point to the first numeral 1. *This is how we write the* NUMERAL *1.*

Look at the next box. Find the star. It tells you where to put your pencil to begin. Let your pencil move with the arrow. How many suns? You've just written how many! Practice again. Write how many suns. . . . How many boys? Write how many.

Continue in the same way. Refer to the picture on page 4. Ask a **how many** question each time the numeral 1 is to be written.

When the page has been completed, pass out the index cards. Each child should make his concept card for one. (See page *xiv.*) Encourage originality.

Have the pupils match sets. Do the sets match? Distribute the numeral cards for 1.

Have everyone help build an oral story. The story is passed to the next person after the word **one** is spoken. You start. *I was out walking on a beautiful day, and I saw* ***one*** . . . Pass the story. It might continue like this: ". . . tiger who took one . . . [pass] bite out of my one . . . [pass] apple."

When the story comes to a reasonable end, interrupt and start a new story.

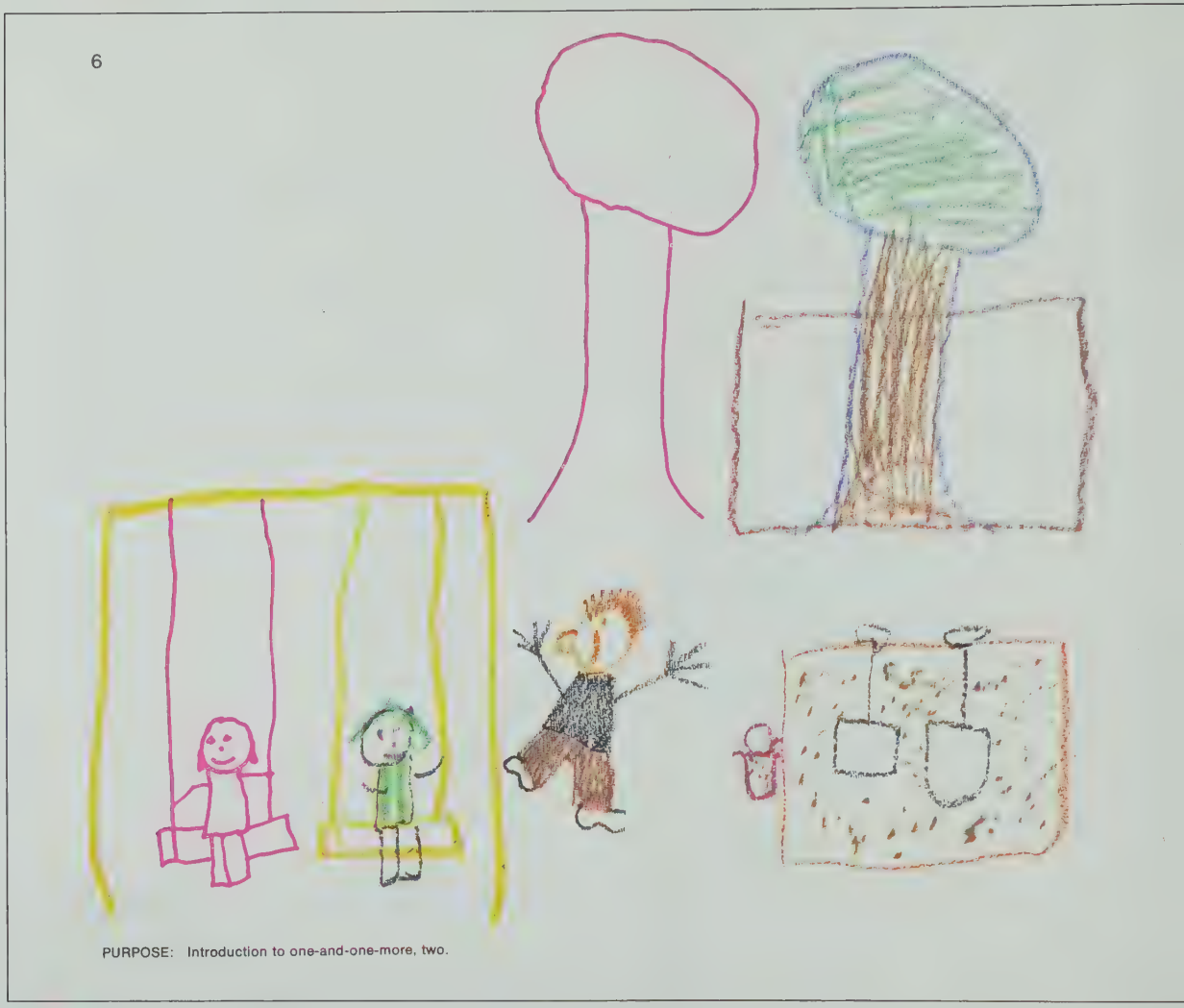
lesson Pages 6, 7

goal Development of the concept of two

page 6 *Do you see any trees? How many? Draw* ONE MORE *tree. . . . You have one tree and one more. Now how many?* (TWO)

Do you see any swings? How many? Draw one more. . . . Now how many? Continue with other objects on the page.

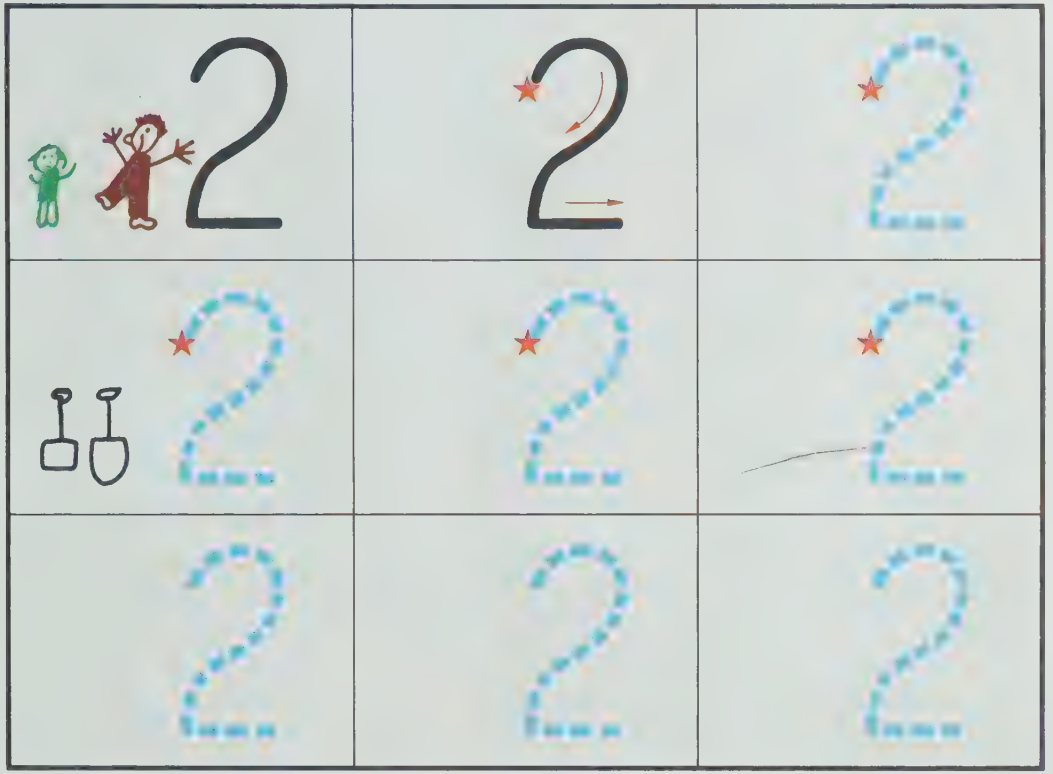
Find some sets of two already in the picture. Then have the children add many new things to the picture by drawing one ball and then one more, one cloud and then one more, and so on.



Do you have one eye? Put your finger beside it. And one more? Where? How many eyes? Do you have one ear? Show me. And one ear more? Where? How many ears? Do you have one foot? And one foot more? How many feet?

You have one arm and one more. That's how many arms? . . . Then how many sleeves must a shirt have? a blouse? a sweater? Extend to legs and pants legs.

name _____



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PURPOSE: Introduction to and writing of the numeral 2.

goal Writing how many in a set of two

memo All practice in writing numerals should be to record **how many.** Practice penmanship later.

page 7 *Here are the people from the picture. How many people do you see? This is how we write 2.* Point to the numeral.

Look at the next box. Put your pencil on the star. How many people? Follow the arrows and write how many. . . . One more time. Write how many people. . . . How many shovels? Write how many.

Refer to objects in the picture each time the child is to write another 2.

lesson Pages 8, 9

goal Making sets of two

memo The word **ring** is used here to avoid any confusion later with the geometric concept of circle.

things for each pupil:
5″ x 8″ index card
numeral card for 2

warm-up Draw an apple on the board. Ask a child to make a **ring** around the apple. Then ask **how many** inside the ring. Draw a tree. Have a child draw one more. Ask how many. Have another child ring 2 trees. Have 5 children each draw 1 object. Have a child ring 2 objects. Is there another set of two?

page 8 One child might ring only 1 set of 2. Encourage him to find more sets. Another might ring as many as 8 sets.

Give much praise.
That's a GOOD job!

When the page has been completed, have everybody dig out his concept card and his numeral card for 1. Hand out the index cards. Each child should make his concept card for two. Pupils should match each other's cards. Do the sets match?

Distribute the numeral cards for 2. Have pupils match their concept cards with their numeral cards for 1 and 2.

8

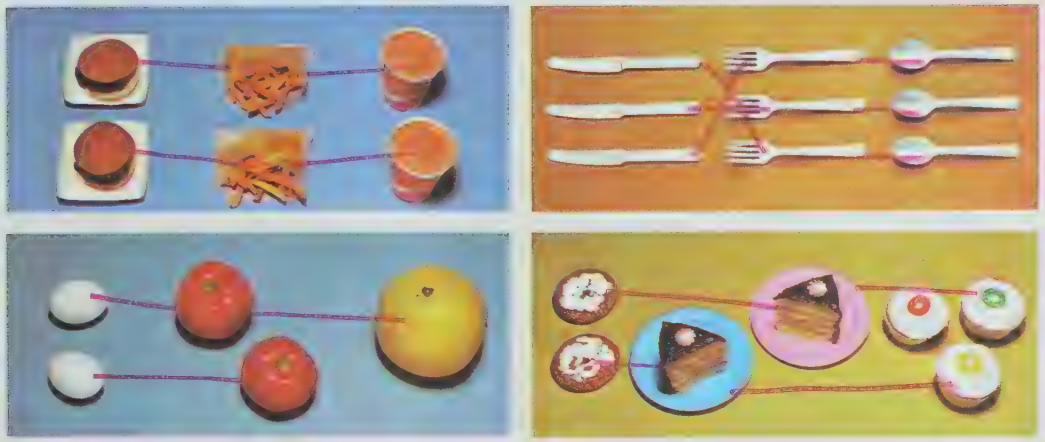
Ring sets of 2. Look for other good answers.

PURPOSE: Making sets of two.

Begin a class mural. With the pupils, decide on a scene—one that can expand as more numbers are developed. *How many of each thing will we make?* Perhaps 2 trees, 1 house, 1 store, for starters.

name _____

Draw lines to match. Look for other good answers.



Draw the same number.

Ring the one with the most.

© 1974, SRA PURPOSE: Matching sets of two, less than two, and more than two.

goal Matching sets of two, sets of more than and less than two.

warm-up Picture 2 stick-people, 2 ice-cream cones, and 2 balloons.

Is there an ice-cream cone for each person? How do you know? Is there a balloon for each? How do you know? What can we do to be sure? (Draw lines to match.)

Repeat with other pictures. The sets need not always match. Ask which set has the MOST. How do you know?

page 9 Have children name the objects in each set.

Is there a bag of french fries for each hamburger? Do these 2 sets match? How can we be sure? Is there a milk shake for each bag of french fries? Do these sets match? How do you know?

Continue comparing the 3 sets pictured for each problem. Stress the idea that sets match when there are as many objects in one set as in another. When sets do not match, it is important to ask **why not.** Develop the concepts of **less** and **more.** Identify the set that has the **most.**

things flannel board and felt pieces

Show 15 objects. Have the children find sets of two and place one set under the other. Check the sets by matching. Remember—the things need not all be alike for any given set.

Clear the board, leaving only 1 set of two. *How many? Here's a problem for really big thinkers! Can anyone show a set that has one less than two?* Match. *Can anyone show a set that has one more than two?* Match.

lesson Pages 10, 11

goal Matching a numeral with sets of one and two

things for each pupil:
numeral cards for 1 and 2

warm-up Hold up 2 books. *Show me the card that tells how many.*

Hold up 1 pencil. *Show me the card that tells how many.*

Hold up 1 book and 1 eraser. *Show me the card that tells how many.*

Continue showing sets of one and two. Make sure that the 2 objects are not always the same.

page 10 These are not discussion questions. Pupils should mark their paper in reply.

Count the hens. Ring the numeral that shows how many. Count the sheep. Ring the numeral that shows how many.

Continue for the remaining sets.

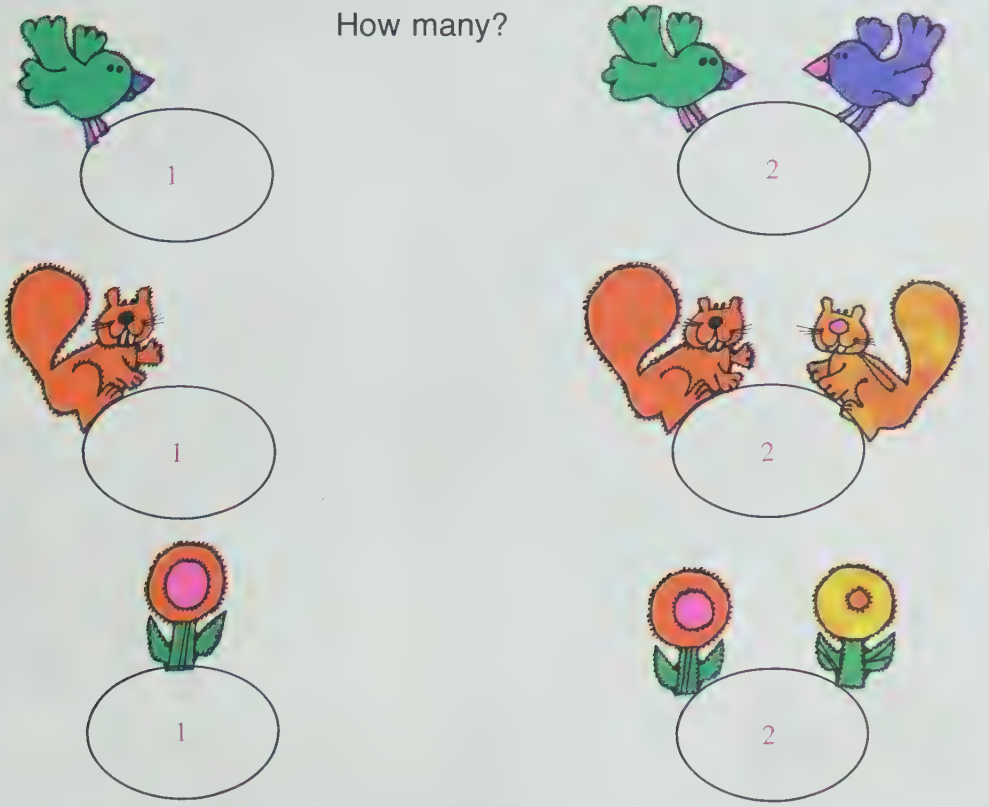
STOP

things for each pupil: numeral cards 1 and 2, counters

Show a set of 1 or 2 classroom objects. Have the children use their numeral cards to tell how many. Then reverse the procedure. Show a numeral card—large enough for everyone to see, please. Have the children make a corresponding set with their counters.

name _____

How many?



© 1974, SRA PURPOSE: Writing how many; recognizing one-and-one-more, two.

goal Writing how many in sets of one and two

memo Watch for those who need more help.

page 11 *How many birds in the* FIRST *set?* Discuss where they should write how many. *Is there 1 bird in the* SECOND *set? Is there more than 1? Write how many.*

Check for children who have difficulty writing the numerals. Have them use numeral cards for 1 and 2 to show how many. If they associate the correct numeral with the set, their problem may be motor coordination.

Do you have a set of cards with numerals made from felt, velour, or sandpaper? (See page 38a. Precut plastic numerals are great too.) Work with 1 numeral at a time. Have the youngster **trace** the numeral with his fingertips to develop a feel for its shape. Then have him try to write it. Still having trouble? Repeat the tracing and writing.

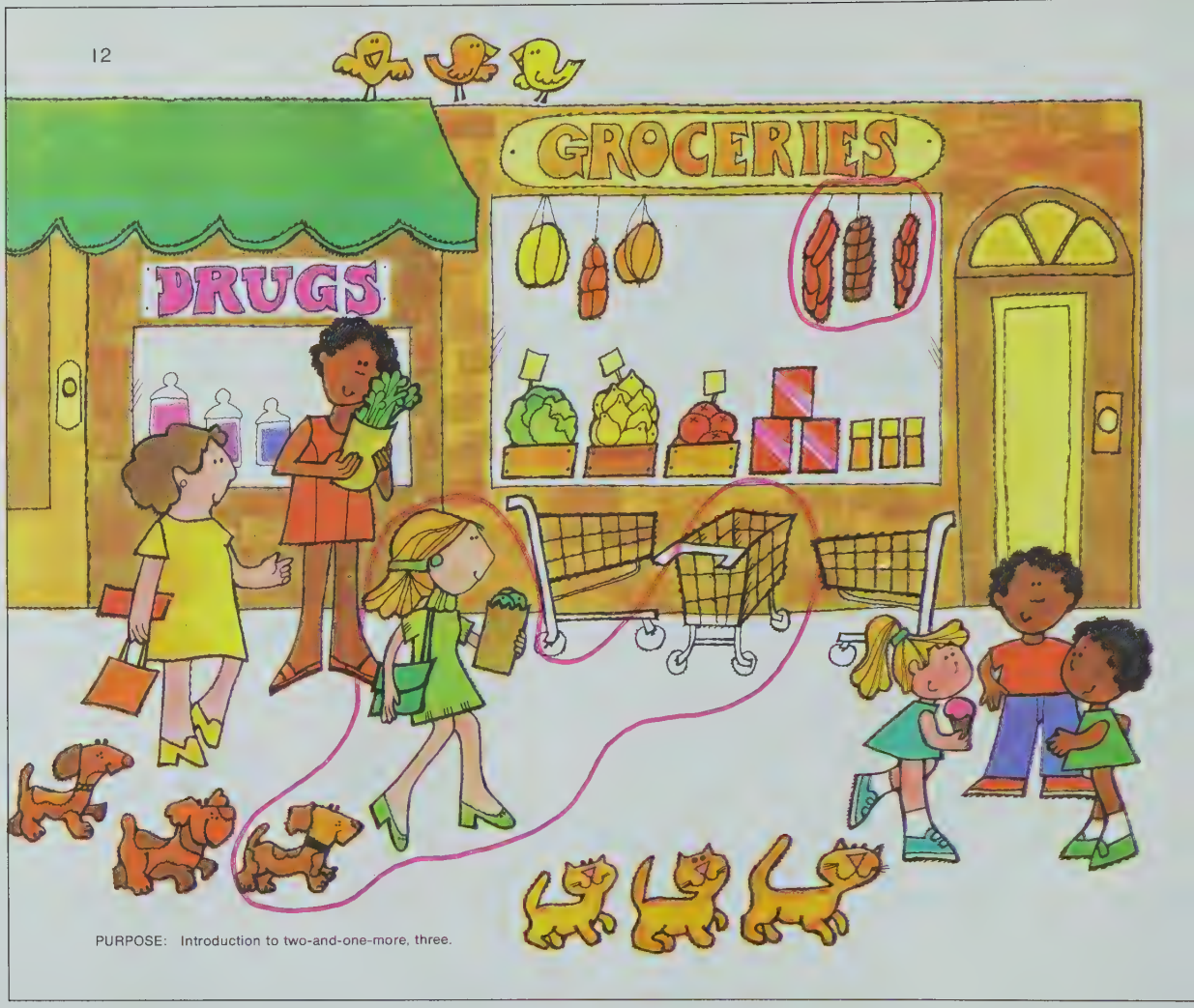
lesson Pages 12, 13, 14

goal Development of the concept of three

page 12 Hunt for sets of three.

Can you find 1 child? 2 children? Is there one more? How many children are there? (THREE) *Your turn to look for a set of two and one more. Who can find a set of three? And another?*

Continue looking for sets of three. You may want the children to ring these sets.



name _____

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PURPOSE: Introduction to and writing of the numeral 3.

goal Writing how many in a set of three

memo Each numeral 3 should be written in answer to a **how many** question.

things for each pupil:
5″ x 8″ index card
numeral card for 3

page 13 *Here are some things that were bought at one store. How many cans? This is how we write 3.* Point to the first 3.

Put your pencil on the star. How many cans? Follow the arrows and write how many. Try it again. Write how many cans. . . . How many kittens? Write how many.

Look for sets of three in the picture on page 12. Ask the children to write how many each time another set of three is named.

When the page has been completed, hand out the index cards. Everybody makes a concept card for three. Have neighbors match cards. Do the sets match? Pass out the numeral cards for 3. Have everyone get out the other cards too. Goodness! Which cards match now? Have pupils match their concept and numeral cards for 1, 2, and 3.

Now is the time to catch the reversed numeral 3. Use sandpaper or plastic cutout numerals for tactile training. Go on a 3 hunt. Every time a child finds the numeral on the calendar, on a reading book page, in a magazine, and so forth, have him **trace** it with his fingers.

goal Making sets of three

things Before school, arrange sets of three around the room.

warm-up Look around the room.

I see a set of three. I wonder if anyone sees the same set I see. What set of three do you see? Pick one pupil and ask him to label it with his numeral card for 3. *Yes, that's a group of three, but it's not the set I see.*

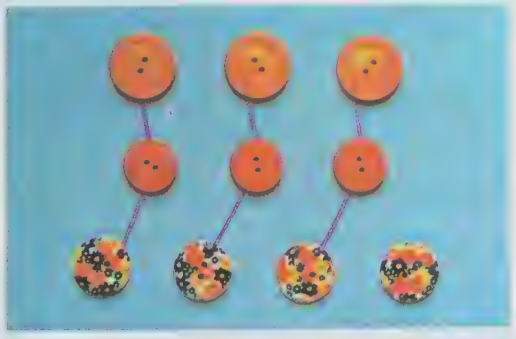
Continue until many sets of three are found.

page 14 There are 36 objects on the page. Some children may ring sets of three until they find twelve possibilities. If a child rings only 2 or 3 sets, encourage him to find more.

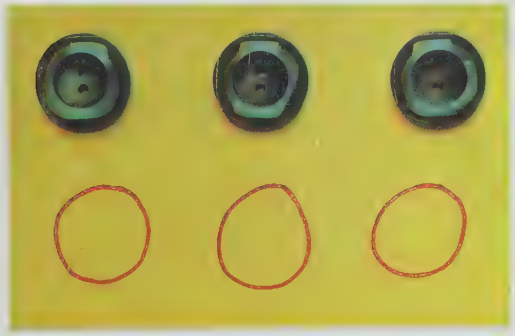
Simon Says can be even more fun now.
Simon says, "Hold up 1 book, 2 hands, 3 fingers, 1 foot."
Simon says, "Write 2 numerals, put 1 head down, point to 2 ears..."

name _____

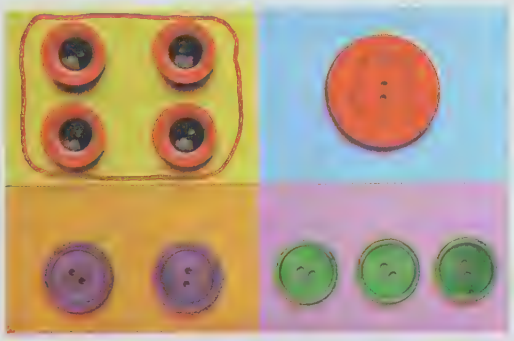
Draw lines to match. Look for other good answers.



Draw the same number.



Ring the one with the most.



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PURPOSE: Matching sets of three, less than three, and more-than three.

things flannel board, felt, yarn

Pair pupils. Use the flannel board. One child makes a set; the partner matches it. Use yarn to show matching. For variety, the first child can challenge his partner to show a set with one more or one less.

The story "The Three Bears" emphasizes matching and sets of three. You might have the children enact it as a play.

lesson Pages 15, 16, 17

goal Comparing sets by matching

memo Ten-trays are made from empty egg cartons. Cut off the lid and 2 end sections so that only 10 remain.

things for each pupil:
ten-tray
counters

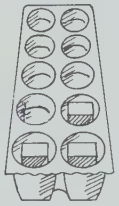
warm-up Show a tray with 3 counters. Challenge the children to make a set with the SAME NUMBER of counters in their own trays. Then ask them to show one more or one less in their trays. Ask how many each time.

page 15 *Does the set of buttons match the set of scissors? How can you be sure?* (Draw lines to match.) *Does the set of scissors match the set of spools? Are you sure? Does the set of buttons match the set of spools? How do you know?*

Continue to compare sets. Don't forget that you can ask the children to match the objects in the third set with those in the first set. Give directions for the rest of the page so that it can be completed independently.

goal Matching a numeral with sets of one, two, and three

memo Everyone should use the ten-tray in a vertical position.



things ten-tray and 3 counters for each pupil:
numeral cards for 1 through 3

warm-up Put 1 counter in the tray. *Show me the card that tells how many.* Put in 1 more counter. *Show me the card that tells how many.* Put in 1 more. *How many?*

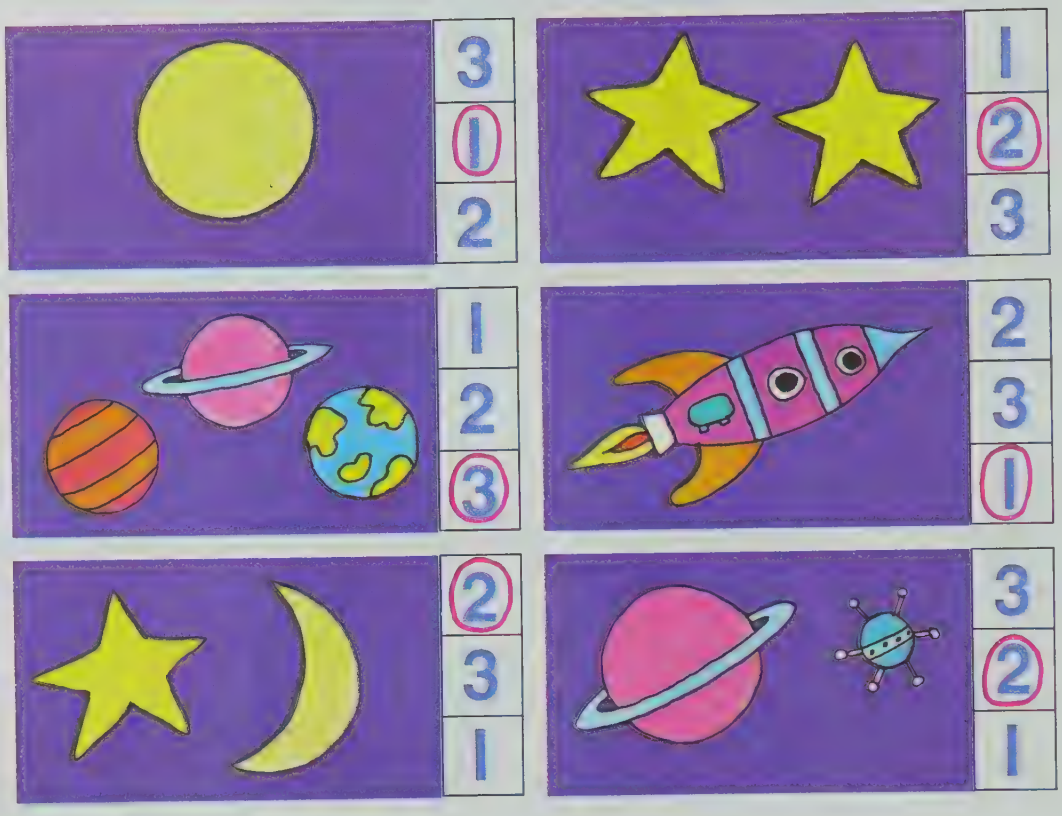
Empty your tray and start again. Put 2 counters in the tray. *Show me how many.* Put in 1 more. *Now how many?* Take out 1 counter. *How many?* Take out 1 more counter. *Now how many?*

page 16 Have the children identify the things pictured in each set. *Count the moons. Ring the numeral that tells how many.*

Continue for the remaining sets. For more writing practice, the children can trace the answer.

16

Ring how many.



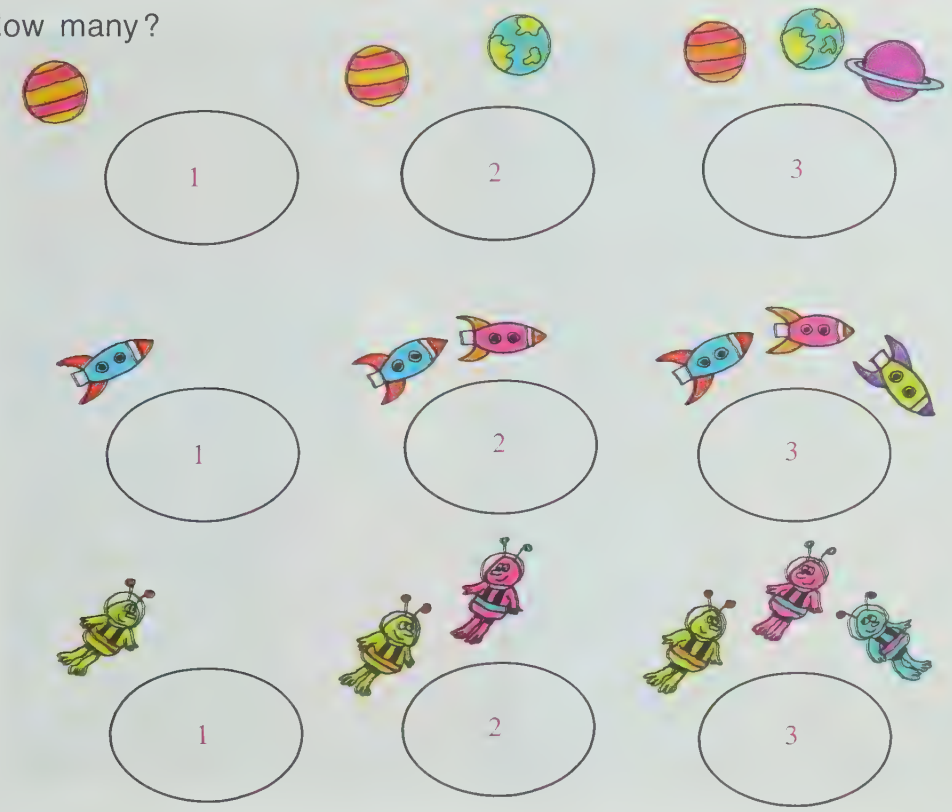
PURPOSE: Finding the number—marking the numeral.

things cube, concept cards 1 through 3

Number a cube with one numeral on each side as follows: 1, 2, 3, 1, 2, 3. A child must match a concept card with the number that lands faceup when he rolls the cube.

name _____

How many?



© 1974, SRA PURPOSE: Writing how many; recognizing order and two-and-one-more, three.

goal Writing how many in sets of one, two, and three

memo Use page 16 to help identify the pupils who can show the correct numeral for a number of objects. Their work should tell you if they can write the numeral.

warm-up Make sure that the pupils understand FIRST, NEXT, and LAST. Call 3 children, one at a time, to the front of the room.

*Who did I call **first?** Who was called **next?** Who was called **last?*** Repeat if necessary.

page 17 Focus on the top row.

Gee, what are those things? How many are in the first set? Write how many. Do you see one and one more? How many in the next set? Write how many in the next set. How many in the last set? Write how many.

Complete the page. Watch for children who have trouble writing the numerals. Let them use their numeral cards to tell how many and praise them for correct answers. Then work to improve their motor coordination.

things for each pair of pupils: stack of 15 to 20 counters

Place a stack of counters in front of each pair of pupils. (Counters remain in a stack throughout the game.) Each pupil in turn takes 1, 2, or 3 counters. The winner is the one who takes the last counter.

things cube, numeral cards 1 through 3

Make dot patterns on the faces of a cube as follows: 1 dot on 2 faces, 2 dots on 2 faces, and 3 dots on the 2 remaining faces. The child matches the appropriate numeral card with the pattern that lands faceup when he rolls the cube.

lesson Pages 18, 19

goal Development of the concept of zero

things for each pupil:
ten-tray
3 counters
numeral cards for 1 through 3

warm-up Have each pupil show an empty tray. *How many things in your tray?*

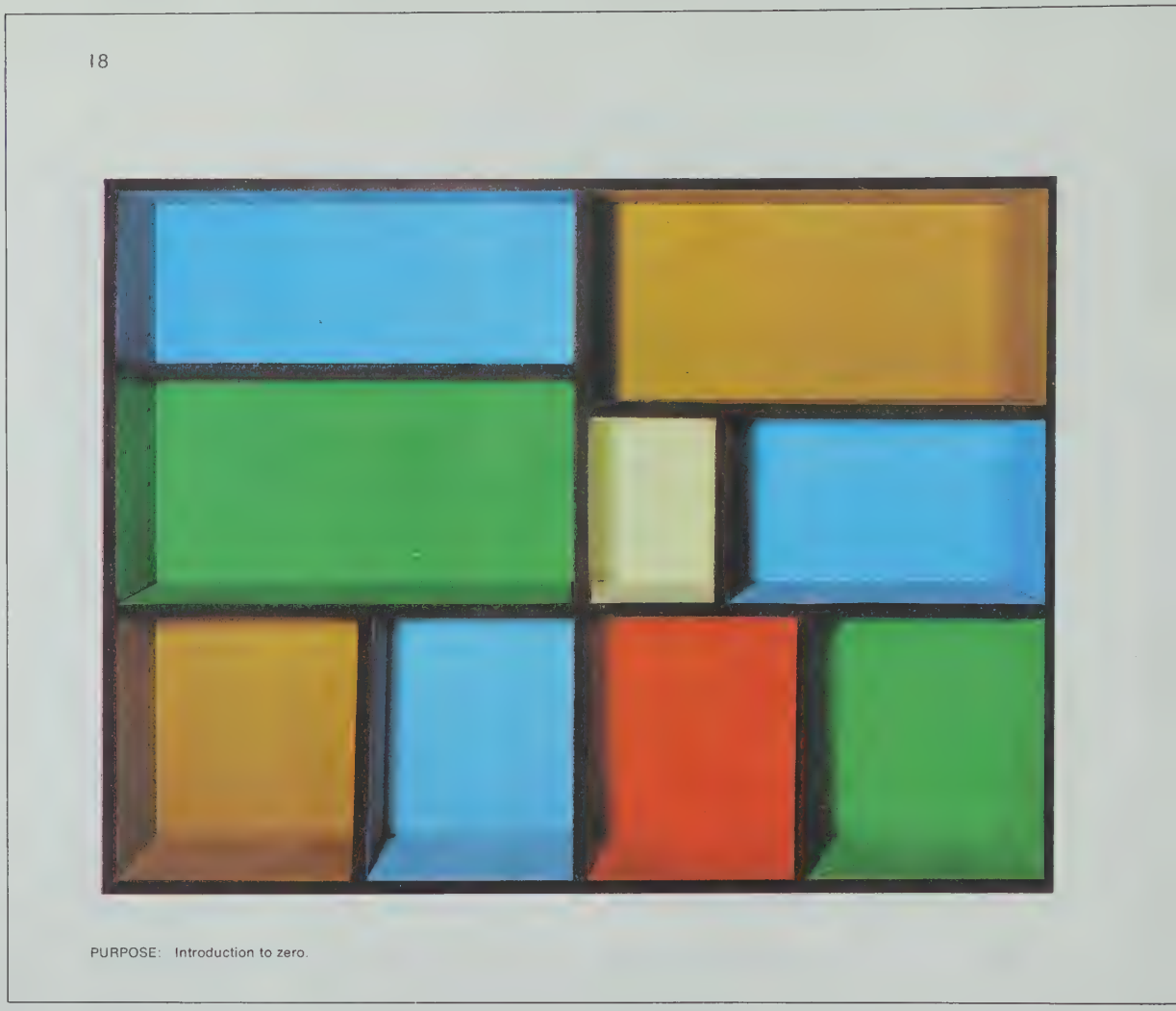
Have the children get out 3 counters and their numeral cards. They reply to questions by holding up a numeral card.

Put 2 counters in your tray. How many? Put 1 more in your tray. Now how many? Put 1 more in your tray. No more counters? How many counters in your tray? How many more do you have? Introduce ZERO for NONE.

Now reverse the procedure with the counters. *Take 1 counter out of your tray. Now how many? What is* ONE LESS *than three?* Continue to zero.

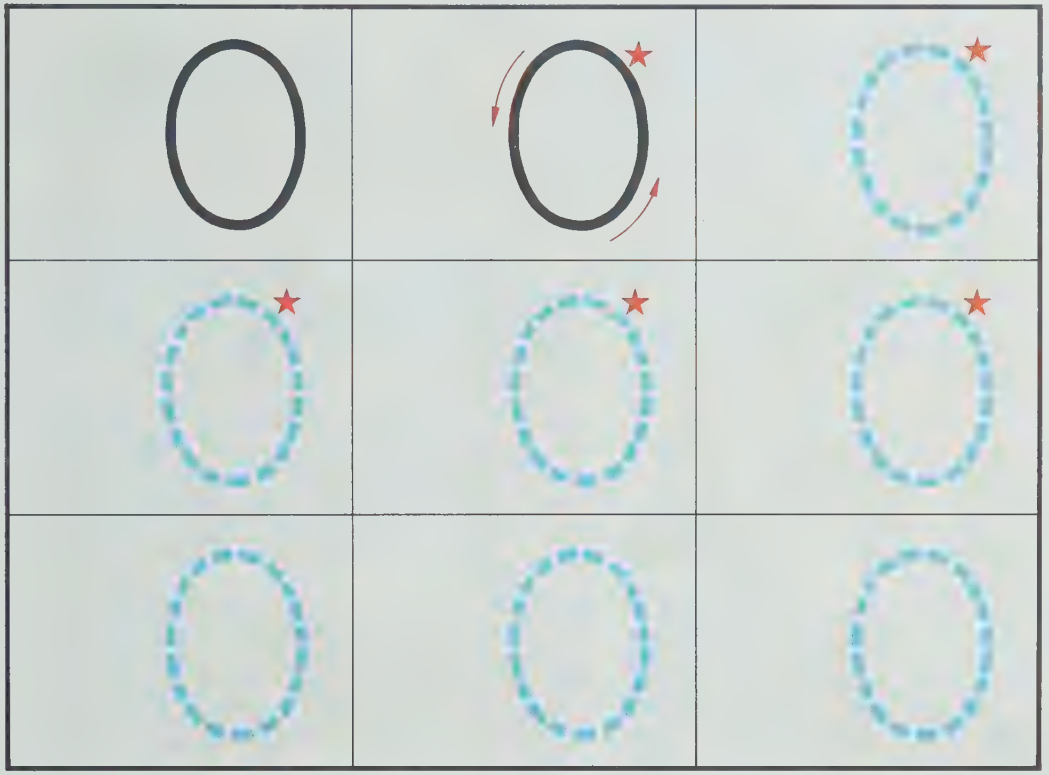
page 18 Show the toy shelves on page 1.

Look at the shelves now! What happened? Remember the books? How many books are on the shelf now? How many trucks? What about the other toys? How many now?



PURPOSE: Introduction to zero.

name _____



© 1974, SRA

PURPOSE: Introduction to and writing of the numeral 0.

goal Writing how many in a set of zero

things for each pupil:
5″ x 8″ index card
numeral card for 0

page 19 Name an object each time pupils are to write 0. Refer back to the empty toy shelves.

How many books are on the shelf now? This is how we write the numeral 0. Point to first 0. *How many trucks are on the shelf? Write how many.*

Continue, to complete the page. The numeral should be written only in response to the question "How many?"

After the page has been completed, hand out the numeral and index cards. Have them get out their cards for 1, 2, and 3 also.

How many things will you draw to show a set of zero? Which numeral tells how many?

Have the pupils match their concept cards with their numeral cards for 0, 1, 2, and 3.

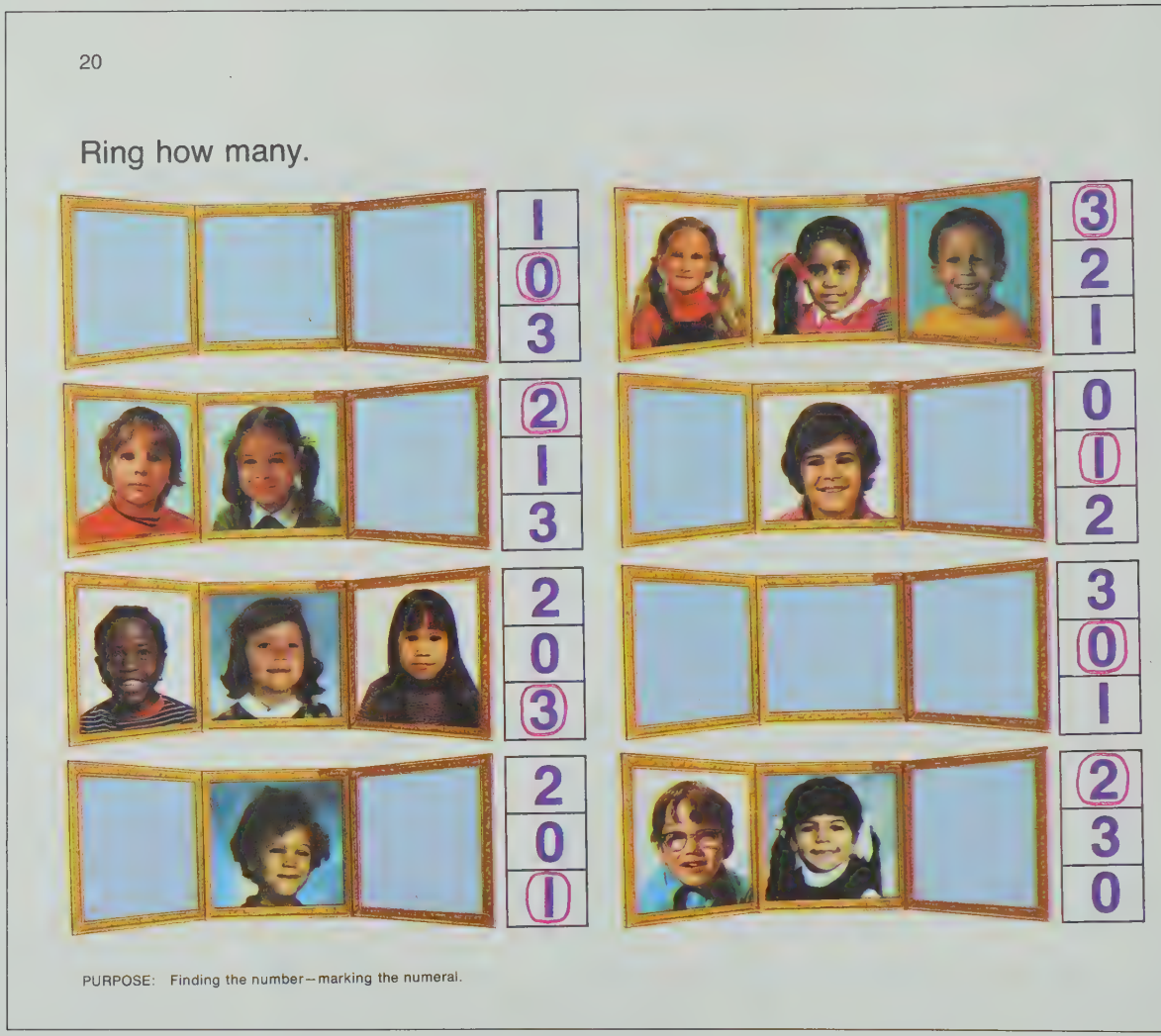
lesson Pages 20, 21

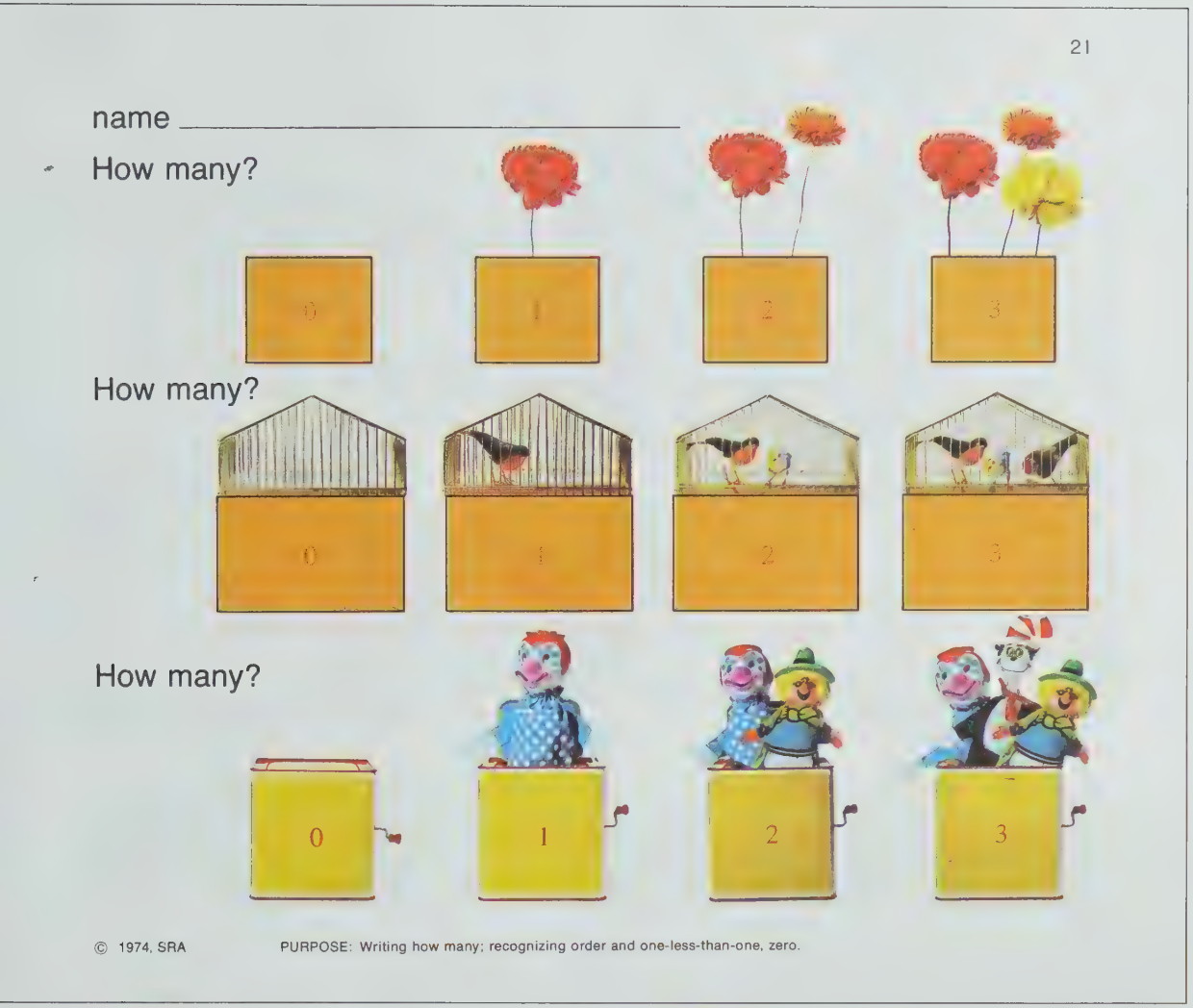
goal Matching a numeral with sets of zero through three

page 20 Each child works independently.

What do we have here? Count the pictures in the first set. Ring the numeral that tells how many. Count the pictures in the next set. Ring the numeral that tells how many.

Continue for the remaining sets.





See activity 1, page 38a.

Time for more pictures on that mural. Include some sets of three.

goal Writing how many in sets of zero through three

memo Again, this page will tell you if any pupil has trouble writing the numerals. If so, let him use numeral cards. Work on his writing problems individually.

warm-up This is the first page that has 4 sets of answer boxes. You will need the word **second** to talk about the page. Use 4 children to establish the meaning of second. Who's first? second? next? last?

page 21 *How many are in the first set? Write how many. How many are in the second set? Write how many. How many are in the next set? Is there one and one more? Write how many. How many are in the last set? Write it.* Continue, to complete the page.

Find out how much your sharpies know.

Does each set in a row have one more object than the set before? Which set in each row has the most objects? the LEAST?

What number of objects is MORE THAN *1 but* LESS THAN *3? more than 0 but less than 2?*

lesson Page 22

goal **Progress check**—counting and writing how many in sets of zero through three; more and less

page 22 Examine the picture.

What animals do you see? Where do you think the animal in the last cage went? What animal is in the first cage?

Give the following directions. *Put your finger by the first answer box. Now look at the picture. How many lions do you see? Write how many in the first box. Count the tents. Write how many in the next box. Count the flags. Write how many in the next box.*

Continue by having the children count and record the number of animals in the last cage, suns in the sky, children, and monkeys in that order.

Ring a set that has more than the set of lions. . . . Put an **X** *on a set that has less than the set of monkeys.*

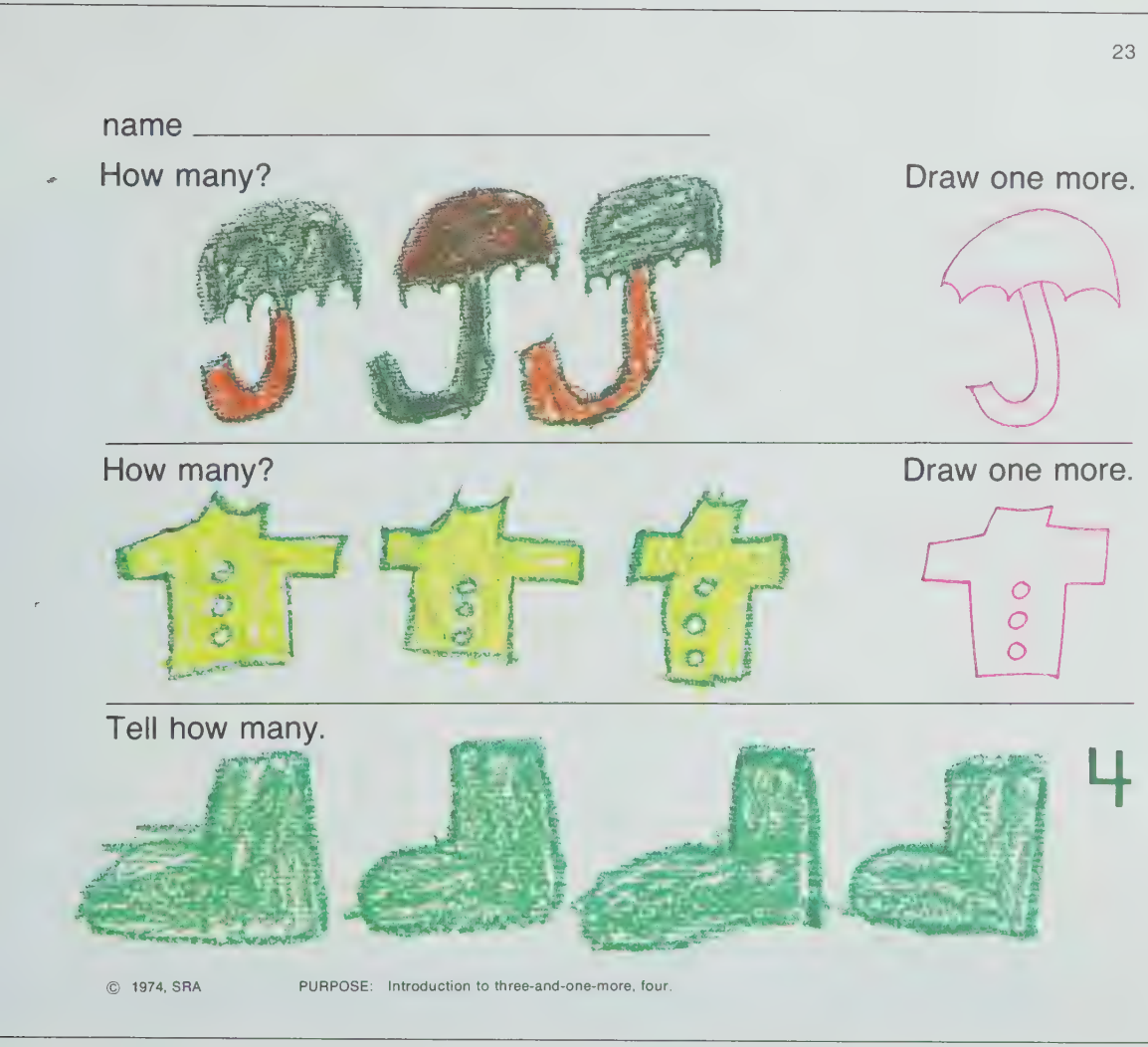
22

1	2	3	0	1	2	3

PURPOSE: Progress check—numbers 0 through 3.

Does anyone need writing practice? Again use the cubes marked with 1, 2, 3, 1, 2, 3. This time the child rolls the cube and writes the same numeral that lands faceup on the cube.

See activity 2, page 38a.



lesson Pages 23, 24, 25

goal Development of the concept of four

things 4 pencils

warm-up Have 4 pencils nearby. Hold up your empty hand. *How many pencils in my hand?* Pick up 1 pencil. *Now how many? What number is one more than zero?*

Continue picking up 1 pencil at a time, asking how many as you add each one.

page 23 *How many umbrellas are there? Draw one more. . . . Now how many?* (FOUR) Count aloud.

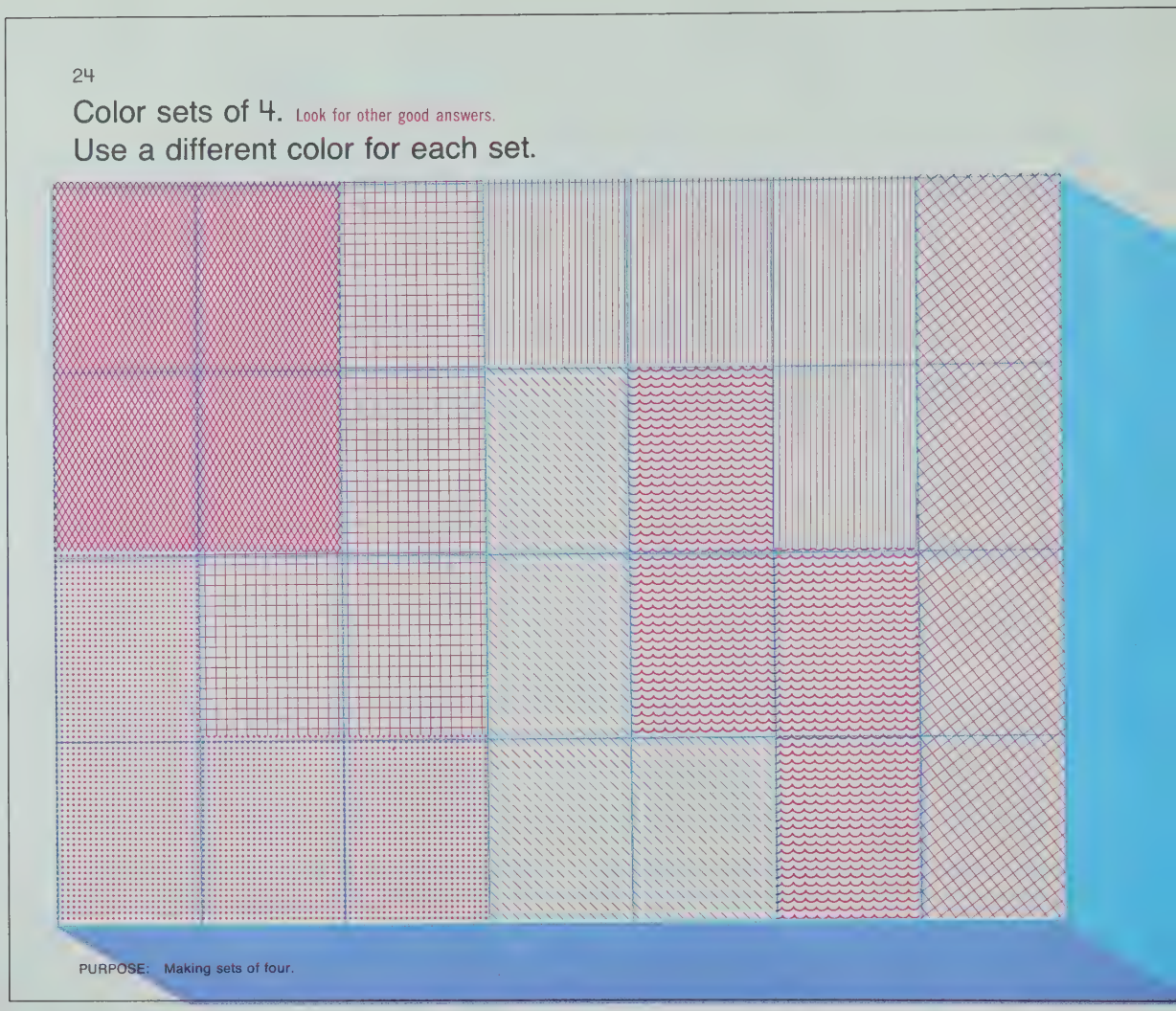
Continue with the next row. Count aloud again. Have the children count the last set.

Compare the 3 sets. Do they all match?

goal Making sets of four

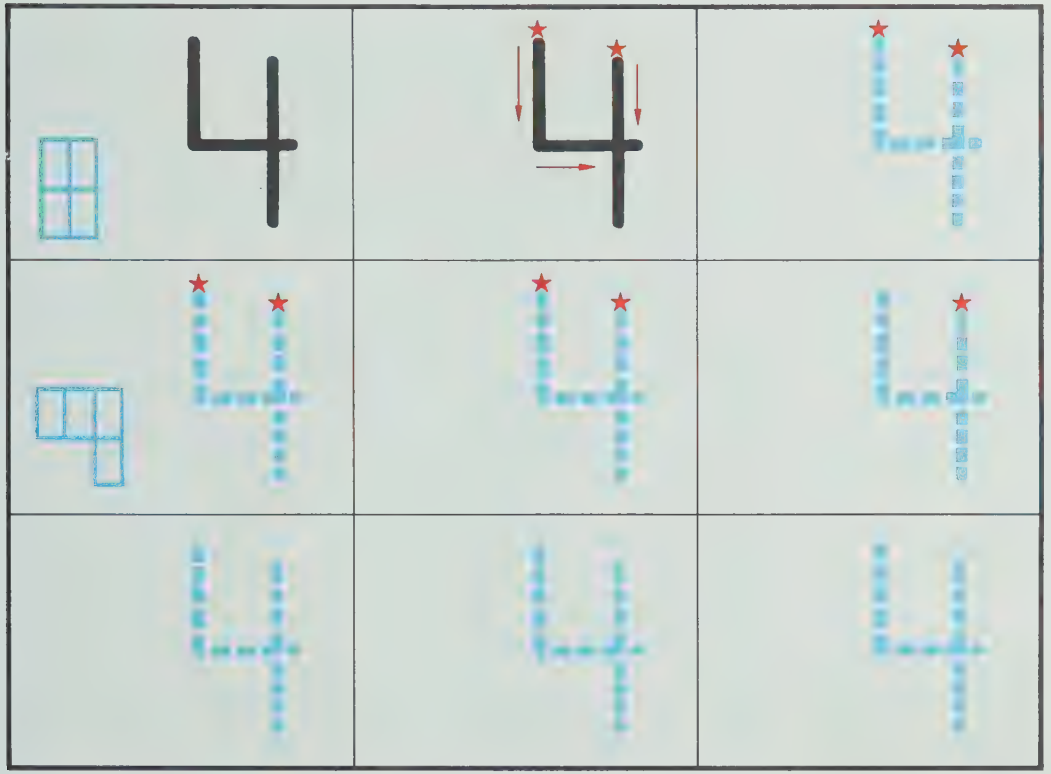
things crayons

page 24 Stress that each set should be made a different color. The 4 red squares might not be together. That's O.K. Since there are 28 squares, 7 sets are possible.



Make a spirit master with an array of at least 45 large dots. (More are O.K., but keep them easy to count.) You will use this sheet many times. This time write on the board: "Ring 4 with red." (A color blob in place of **red** will let you eliminate words.) "Ring 3 with blue." "Ring 2 with yellow." "Ring 1 with black."

name _____



© 1974, SRA

PURPOSE: Introduction to and writing of the numeral 4.

goal Writing how many in sets of four

things for each pupil:
5″ x 8″ index card
numeral card for 4

page 25 *How many blocks are in this first box? This is how we write the numeral 4.*

Point to the first 4. Then review what the stars and arrows tell. Proceed as on previous similar pages. Be sure to ask a how-many question each time the children are to write a 4.

When the page has been completed, each child gets an index card and makes a concept card for four. Then hand out the numeral cards for 4. Have the children get out their sets of cards for 0 through 3 too. They mix up the cards for 0 through 4 and then match concept and numeral cards.

lesson Pages 26, 27

goal Matching a numeral with sets of zero through four

things concept cards and numeral cards for 0 through 4

warm-up Pupils use concept cards to reply.

Show a set of three. Which set is ***one less than*** *three? Put that set* BEFORE *the three. . . . Which set is* ***one more than*** *three? Put that set* AFTER *the three. . . . Put the card that tells how many under each set.*

Repeat the activity, beginning with the concept card for two.

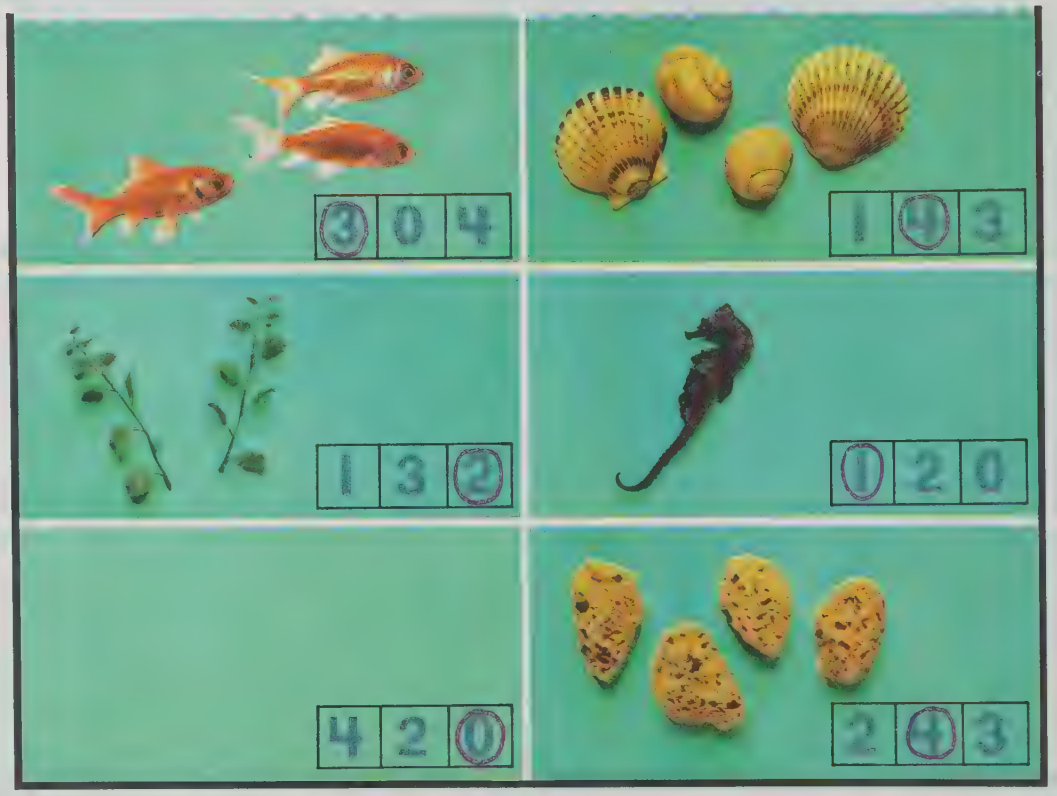
page 26 Get the pupils started on the page. *Count each set carefully. Ring the numeral that tells how many.* The rest of the page is independent work.

After they've finished, take another look at the page.

How many sets have 4 objects? How many have only 2 objects? How many have exactly 3 objects?

26

Ring how many.



PURPOSE: Finding the number—marking the numeral.

things ten-tray, 4 counters, numeral cards 0 through 4

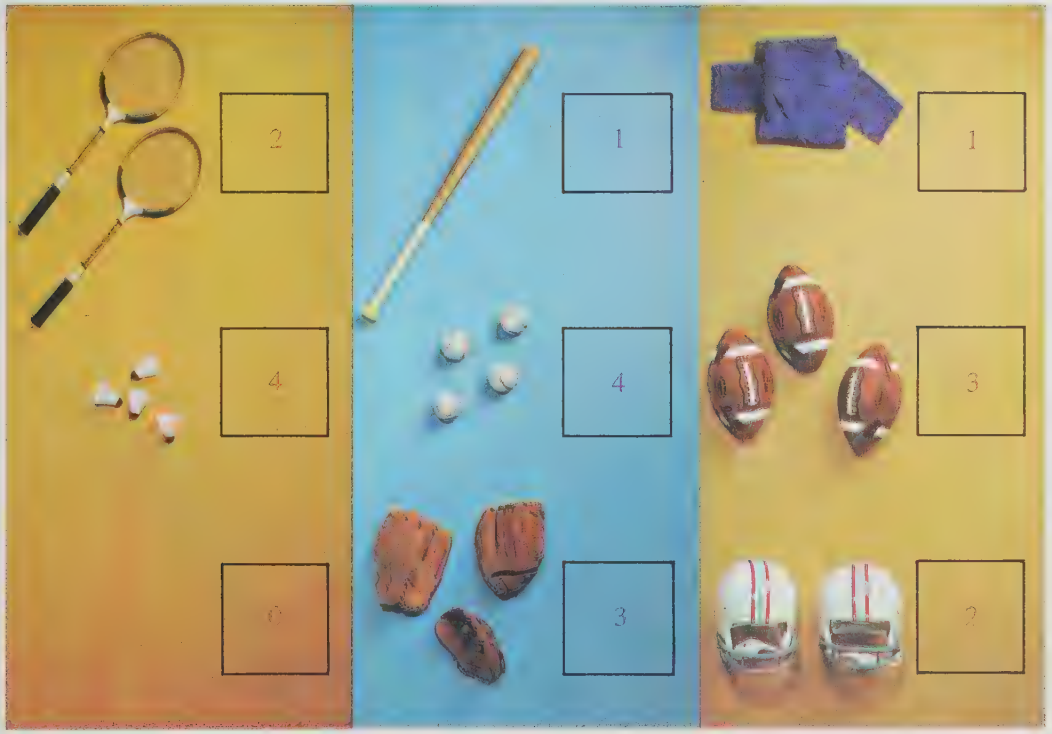
Pair pupils. One child places a set of counters in the tray; the other child must show how many with a numeral card. Pupils alternate roles.

things numeral cards 0 through 4

Pick 5 pupils to stand next to each other. Give each a numeral card from 0 through 4 (not in order) to hold over his head. Don't let anyone peek at his own card. The goal is to get themselves in order by looking at one another's cards.

name _____

How many?



© 1974, SRA PURPOSE: Writing how many.

See activity 3, page 38a.

Write partially completed counting sequences on the chalkboard. Have pupils write the numerals to complete each sequence. Use counters and numeral cards to prove the answer. 1__3 __2__ 0__2__
0__2 __1__ 1__2__

goal Writing how many in sets of zero through four

warm-up The pupils have not been encouraged to use the chalkboard yet. Maybe now is the time. Draw 2 objects. Ask someone to write how many. Does the class agree with the answer?

Repeat with sets of three, one, and four. Always ask if the class agrees. If an error is made or if a numeral is written backward, ask another pupil to help the person who made the error. The notion of helping one another is a good thing to get started.

page 27 *Count each set. Write how many.* This is independent work.

After the page has been completed, focus on the 3 sets in the first COLUMN. Which set has the **least** things? the **most** things?

Continue the same line of questioning for the remaining columns.

lesson Pages 28, 29, 30

goal Development of the concept of five

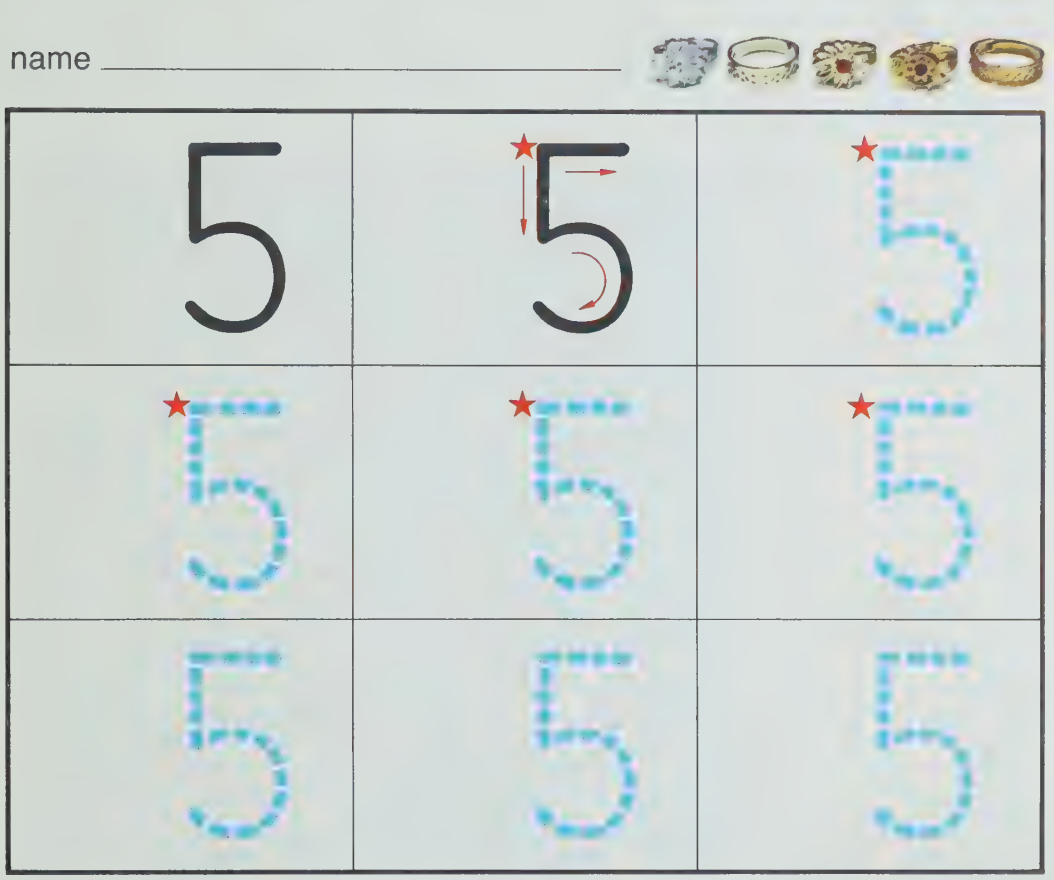
warm-up Pair pupils. Have each child hide one hand behind his back.

Hold up some fingers on one hand. Show your hand to your partner. Ask your partner how many fingers he sees.

Now have them match their fingers and decide who is showing **more** or **less** fingers and how many more or less.

page 28 *Count the fingers on one hand. How many?* (FIVE) ***Trace*** *your hand on this page. Count the fingers you just drew. How many fingers in the picture? Does your picture look like your hand? What does your hand have that your picture doesn't have?* (Fingernails) *How many? Make a fingernail on each finger.*

Suggest putting a ring on each finger, a bandage, and so on. Continue to emphasize how many.



goal Writing how many in a set of five.

things for each pupil:
5″ x 8″ index card
numeral card for 5

page 29 *This is the numeral that tells how many fingers on one hand.* Point to the first 5.

Review the star and arrow markings. Ask how many rings, fingernails, bandages, fingers on the other hand, toes on one foot, toes on the other foot, so that children write the numeral to record **how many.**

Five is a hard numeral for many pupils to write.

Have Patience!

After the page has been completed, hand out the index cards. Each pupil makes a concept card for five. Distribute the numeral cards for 5 and get out all the other cards too. Children match their concept cards with their numeral cards for 0 through 5.

things soft clay

Pupils with motor coordination difficulties will benefit from kinesthetic experiences. One technique is to have them write numerals with a finger in soft clay.

goal Making sets of five

things crayons

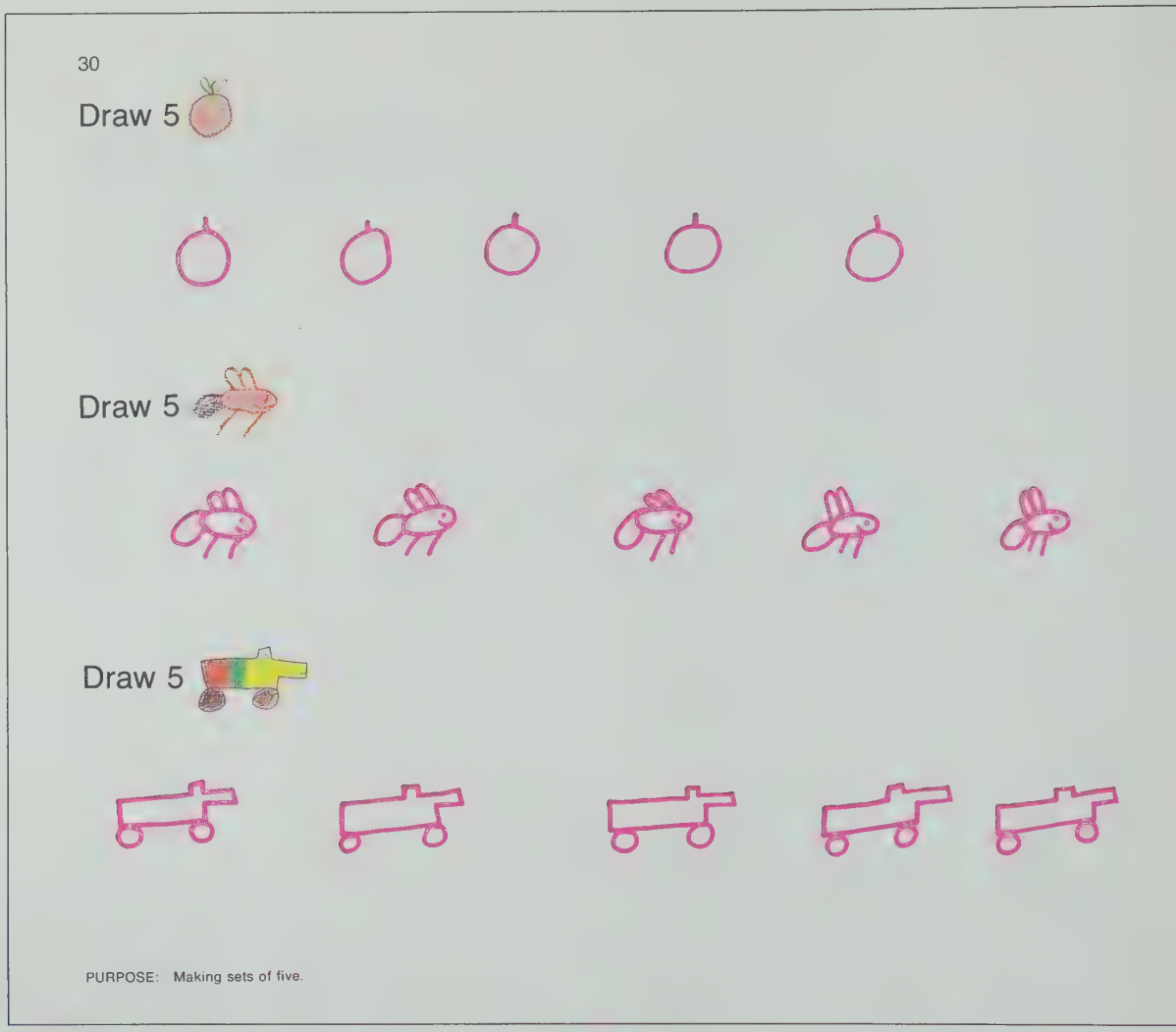
page 30 Make sure that they understand what to do. Carry on as directed on the page.

When all the children have their sets of five drawn, ask them to go back and look at the first row. *Find a green crayon. Ring one of your apples with green. Now use your red crayon. Ring 4 other apples with red. Are there any more that could be put in a ring?*

Continue to the next row. Ask that three be in a blue ring and two in an orange ring. Are there any more?

For the last row, have them ring five with black. Ask if there are any more that could be put in another ring.

Finally ask which of the sets in a ring has the GREATEST NUMBER of objects. Which has the LEAST NUMBER?



STOP

things bundled sets of five (lollipops, pencils, candy in cellophane packages)

How many people can you give a lollipop to? Count out that many and give each a lollipop. You may include yourself.

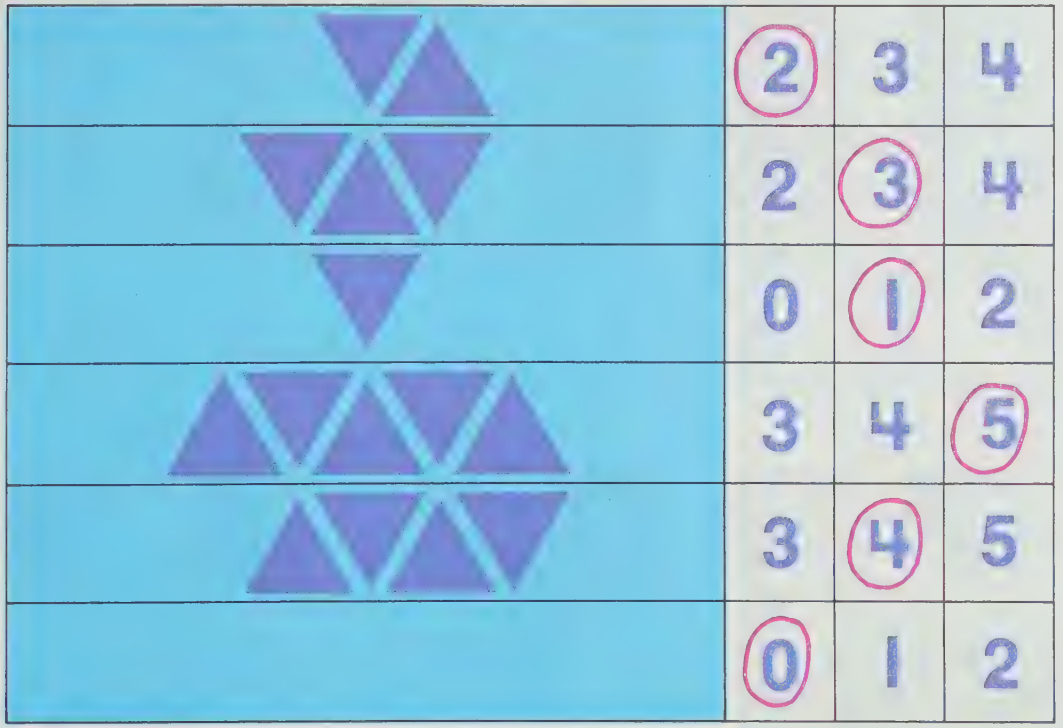
Repeat with the other sets.

STOP

Go on a hunt. Find a set that matches the number of fingers on one hand.

name _____

Ring how many.



© 1974, SRA PURPOSE: Finding the number—marking the numeral.

Time to expand the class mural to include sets of four and five.

lesson Pages 31, 32

goal Matching a numeral with sets of zero through five

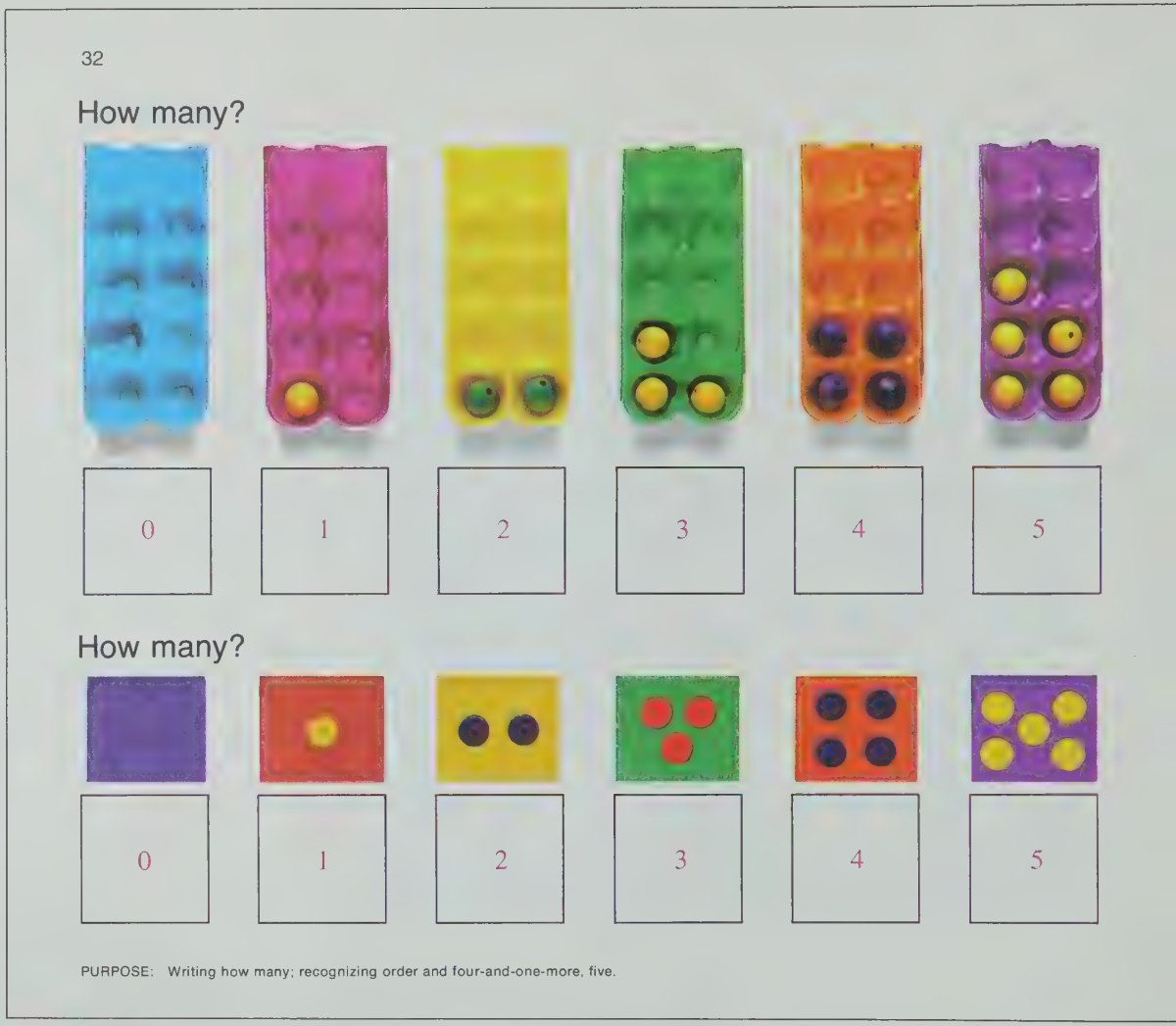
warm-up Practice counting from a number to a number (up to five).

page 31 Again, simply follow directions as given on the page.

goal Writing how many in sets of zero through five; recognizing order of 0 through 5

page 32 Discuss directions. This is independent work.

When you are finished with the page, look back to page 31. Consider having each pupil cut apart the strips. The strips can then be arranged in ORDER from the least number of shapes to the greatest number of shapes and pasted on paper.

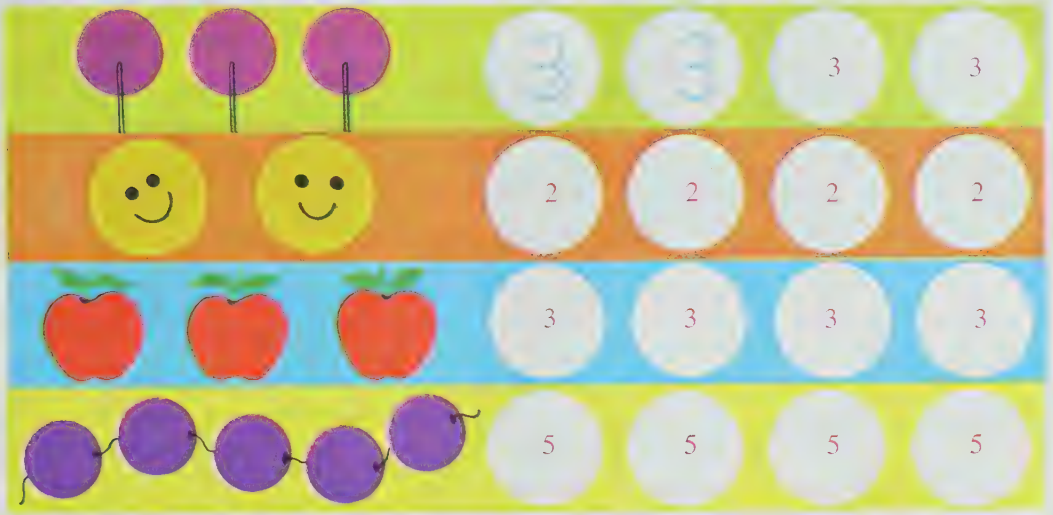


If reversed numerals are still evident, this is a good time to do some chalkboard work. *Is this five?* Write ⅁. *What's wrong? Who can write 5 on the board for us?*

Continue with other troublesome numerals. If reversals persist, get a specialist's advice. Repeated reversals can signal serious perception problems.

name _____

How many? Practice writing here.



What is missing?

0	1	2	3	4	5	6

© 1974, SRA PURPOSE: Writing how many; recognizing order.

lesson Page 33

goal Practice in counting and writing how many in sets of zero through five; ordering the numbers 0 through 5

memo Time to provide additional help for those who are having trouble. Watch for children who write the numerals in reverse.

page 33 Can the children figure out the directions for themselves? Give help only where needed. Ask what that new numeral in the bottom row is called.

lesson Pages 34, 35

goal Development of the concept of six; writing how many in a set of six

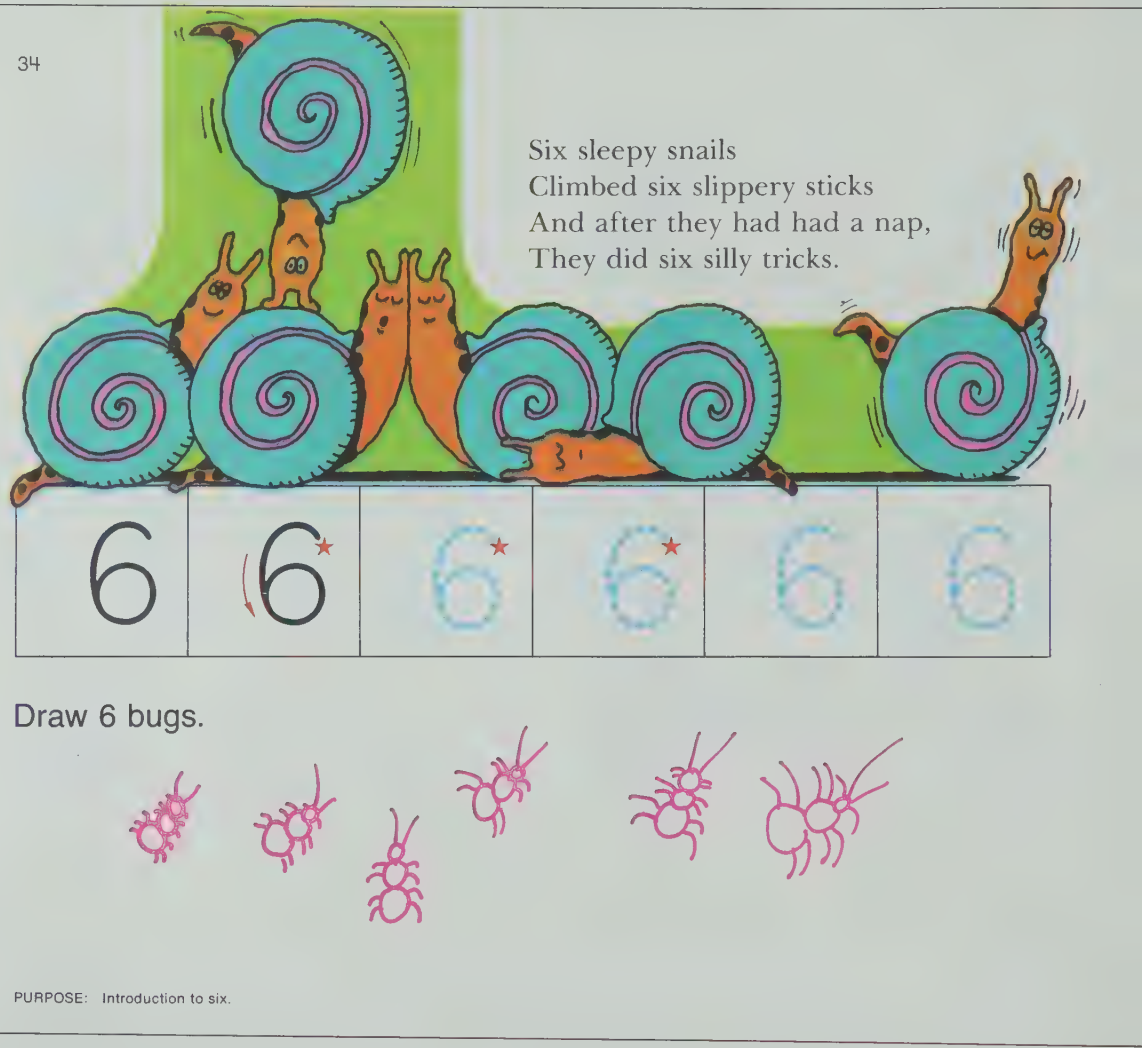
memo The rhyme has the word six. Point out that it is another way to write how many.

page 34 Count the snails from left to right and from right to left. Read the rhyme.

How many snails? This is how we write 6. Point to the 6. *Does each snail have a tail? How many tails?*

Continue the questions with six sticks, six silly tricks, and the number of boxes that have the numeral 6. Ask a how-many question each time the numeral is to be written.

Have fun!


34
Six sleepy snails
Climbed six slippery sticks
And after they had had a nap,
They did six silly tricks.
6 6 6 6 6 6
Draw 6 bugs.
PURPOSE: Introduction to six.

35

name _____

Color sets of 6. Look for other good answers.
Use a different color for each set.

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PURPOSE: Making sets of six.

See activity 4, page 38a.

goal Making sets of six

things for each pupil:
5″ x 8″ index card
crayons
numeral card for 6

warm-up Distribute index cards. Have each child make his concept card for 6.

page 35 Let them go to it and color sets of six. Each set of six must be a different color—no need for any special order. Notice that there are 40 boxes, so not all of the boxes will be colored.

Award a numeral card for 6 as a prize to any child who found 6 sets of six. Let another pupil help those who didn't make it. Then everyone will have a numeral card for 6.

lesson Pages 36, 37, 38

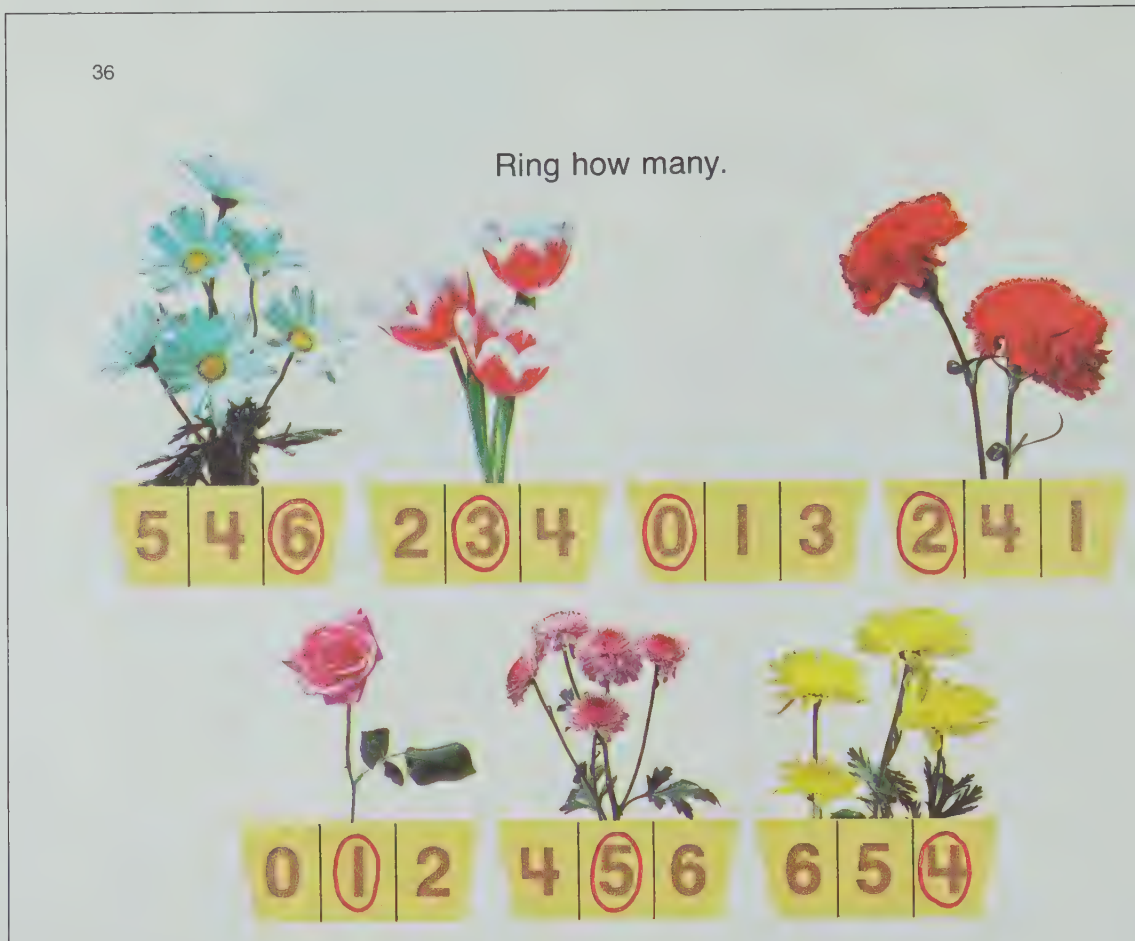
goal **Checkout** – matching numerals with sets of zero through six

things ten-tray
6 counters
numeral cards for 0 through 6

warm-up Using a ten-tray, show a set of four. Pupils tell how many by holding up a numeral card. Continue with additional sets through six.

page 36 *Look at the flowerpots. They have numerals written on them. Are the same numerals written on every pot? How many flowers are there in the first pot? Can you find the numeral that tells how many? Good! Ring it.*

The rest of this page is independent work. A child who makes more than one mistake needs more help. Determine whether the problem is one of counting or one of identifying the numerals given.



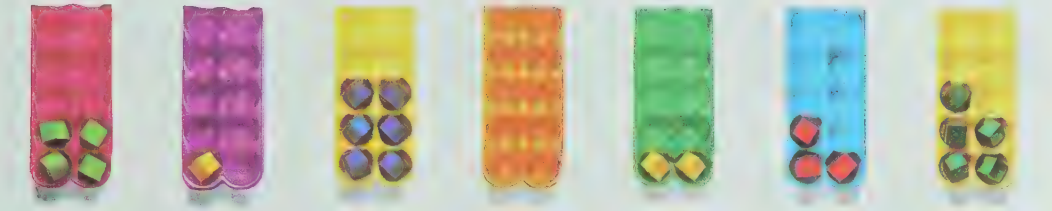
things for each pupil: concept and numeral cards 0 through 6

Pair the pupils. Have one jumble his concept cards and lay them out. The partner matches his numeral cards to the appropriate set. Switch the jobs and repeat. Encourage partners to try to fool each other.

See activity 5, page 38a.

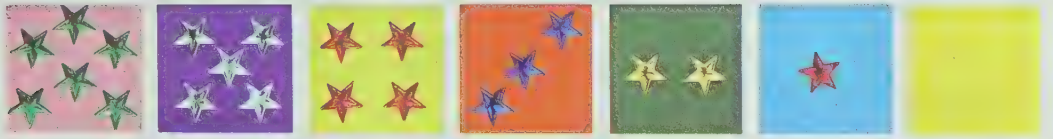
name _____

How many?



4	1	6	0	2	3	5

How many?



6	5	4	3	2	1	0

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PURPOSE: Checkout—numbers 0 through 6.

goal **Checkout**—writing how many in sets of zero through six

memo If a pupil successfully completed the last page, you will be watching for success in writing the numeral only. He has already shown that he can count.

page 37 Since this is a checkout, it should be independent work.

things large numeral cards 1 through 6

For more practice, play How Many Times?
Teacher: Clap your hands.
Pupil: How many times?
Teacher: This many. (Show a numeral card.)
Possible activities: step forward, hop back, jump, turn around.

goal Extra practice in writing the numerals 0 through 6 in order; recognizing sets of six

page 38 Review directions. Then this is independent work. Note that pupils need not have a set of 6 letters that are the same. Any old set of six will do.

38

Write what's missing.

0	1	2	3	4	5	6
0	1	2	3	4	5	6
0	1	2	3	4	5	6
0	1	2	3	4	5	6

Ring sets of 6. Look for other good answers.

a a
a a
a a

b b b
b b b

c
c c
c c

d
d
d
d
d
d

e e e e e e e

f f
f f f f

g g
g g

PURPOSE: Writing numerals and recognizing sets of six.

Does the mural include a set of six? Is the mural finished? Be proud. Display it in the hall.

RESOURCES

another form of evaluation

for progress check—page 22

The pupil will need his numeral cards and paper and pencil.
You will need 2 ten-trays and 6 counters.

Use only one tray to start. Put in 3 counters. Ask him to show you the numeral card that tells how many. Empty the tray. Put in 1 counter and ask him to show the numeral card that tells how many. Continue for 0 and 2 objects. Then give him the tray. You hold up his cards one at a time. He puts in the number the card says.

Now use both trays. Put 1 counter in the left tray and 3 counters in the right tray. Ask him to point to the tray that has more than 2 counters. Ask him to write how many are in the tray on the right and how many are in the tray on the left. Continue. Empty both trays. Put 3 counters in one tray and none in the other. Ask which tray has less than 3 counters. Have him write how many each tray has.

for checkout—page 37

Use basically the same technique as the alternate evaluation for the progress check, except this time you need 12 counters.

By working with each child separately, you will be able to determine which numbers he knows best and to focus your attention on those that appear to need the most practice (or individual tutoring).

kinesthetic numeral card

things poster board, felt numeral, sheet of acetate, washable crayon

Use poster board. Picture a set. The children can draw the objects. Glue on the card the felt (adhesive velour or sandpaper) numeral that tells how many. With a felt-tip pen, make a guide outline for writing this numeral. Provide a line on which the child can try to write. Cover the numeral-writing area with a sheet of acetate or transparent adhesive paper. The child writes with washable crayon or an erasable overhead-projector pencil so that the card is reusable. Do you have a laminating machine available? Then laminate the completed card **before** attaching the felt numeral.

activities

1. things container with 4 sets of counters

Select 4 different kinds of counters—dried beans, washers, buttons, empty spools, and the like. Include a set of one, a set of two, a set of three, a set of four.

First the pupil sorts the counters into sets of things that are the same. Then he arranges the sets in order from the least to the greatest number. *Which set has the least things? Which set has this many and one more?*

2. things 10 counters, 5 jars

Here is a bunch of counters and 4 jars. Your job is to put some counters in each jar. The rule is that each jar must have a different number inside. After the job is finished, give the child an empty jar. Ask how many are in the empty jar. Now his job is to arrange the jars in order from that with the least number to that with the greatest number of objects.

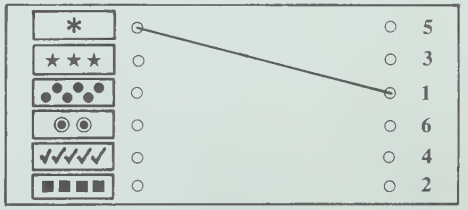
3. Make a spirit master like the following:

show one less	show	show the same number	show one more
	2		
	1		
	3		

Leave enough space to draw objects.

4. things poster board, shoelaces, pictures cut from magazines

Have the children paste pictures to form sets in the boxes at the left. Write the numerals in mixed order. Knot a shoelace and thread it through the board. The child puts the lace in the hole next to the numeral that tells how many.



5. things plastic fruit baskets, plastic models of animals, pill bottles

How about building a zoo? Use the baskets for animal cages. If you don't have models of animals, the children can draw them. You can make paths from one part of the zoo to another. Add some trees and waste containers. (Those pill bottles are just the right size.) Don't forget about the refreshment stand.

Ask all kinds of how-many questions.

additional learning aids

concept — chapter objectives 1, 2, and 3

SRA products

Inquisitive Games: Exploring Number and Space, SRA (1967)
- One to Three Game
- One to Six Game
- Land and Water Animals Game

Mathematics Involvement Program, SRA (1971)
- Cards: 121, 161, 201, 211, 221, 231

Skill through Patterns, level 1, SRA (1974)
- Spirit masters: 1, 2

Visual Approach to Mathematics, level 1, SRA (1967)
- Visuals: 2, 3, 4, 5, 6, first and second suggested activities

other learning aids (described on page 128d)—Counting Blocks, Counting Chips, Counting Rods, Hainstock Blocks, Lots-A-Links, Number Boards, Number Sorter, Unifix (cubes and number trays)

notation — chapter objectives 4, 5, 6, and 7

other learning aids— Beginners Number Poster Cards, Magic slates, Matchmates*, Numberite, Stepping Stones

*Trademark of Sigma Scientific, Inc.

"Look at the big plane, Jeffy!"
"That's littler than the one I got for Christmas."

The Family Circus by Bil Keane,
reprinted courtesy of The Register and Tribune Syndicate

2 EXPLORING LOCATION, SHAPE AND SIZE

before this chapter the pupil has—

1. Identified the object that is first, second, next, and last in an ordered set
2. Identified sets that match, the set that has more, the set that has less
3. Shown a set that has one more, that has one less
4. Ordered the numbers 0 through 6

in chapter 2 the pupil is—

1. Developing location words
2. Examining the sizes and shapes of real objects
3. Sorting objects into sets that are alike
4. Telling how objects are alike, how they are different
5. Finding the set that has more, less, most, least
6. Showing a set that has one more, that has one less, that is between
7. Identifying the object that is first, second, third, next, last
8. Reviewing the order of numbers from 0 through 6

in later chapters the pupil will—

1. Sort a set of objects such as boxes, cans, and balls by their likenesses and their differences
2. Find the flat surfaces and curved surfaces on such objects as boxes, cans, and balls
3. Give the ordinal name for an object in an ordered set having not more than ten objects

Notes & Things

Many math words are used in everyday conversation. The overall goals of this chapter are to acknowledge the need for these words, introduce them in such a way that they are used correctly, and at the same time apply some of the concepts learned in the first chapter.

The context is the exploration of the shapes and sizes of objects in the real world. The examination of simple things such as round pieces of fruit and balls (spheres), all sorts of things that are shaped like a can (cylinders), and different kinds of boxes (rectangular prisms) is the beginning. It is important that these shapes be touched, handled, and sorted into various categories. The question "How many?" is expanded to include the questions "How are these things alike?" and "How are they different?" Your junk boxes will get a real workout in this chapter.

Ordinal names and labels for position share the spotlight with the study of shape and size. This chapter provides readiness for the later chapter on geometry. (See page 186c.) The learner handles objects with curved surfaces and flat surfaces. The tactile exploration of a three-dimensional object allows the two-dimensional figure to be simply viewed as a shape that is made up of straight sides or curved sides. The definitions of rectangles, squares, triangles, and circles are postponed for later study.

The number of objects in a given set is reviewed, and the size relation of the objects as well as the number relation comes from intuitive, commonsense development. You and the children will enjoy this chapter.

words

Concept-development words and phrases used in this chapter are listed in columns in the order in which they are used orally with the pupils. Those words that also appear on a pupil page are marked with *.

left	curved sides	first
right	straight sides	second
curved surface	third	next
flat surface	between*	last
largest	patterns	more-less*
smallest	circle	how many

things

sorting trays
boxes, cans, and balls of various sizes
pupils' concept and numeral cards for 0 through 6
1 set of numeral cards 0 through 6 large enough for a whole group to see (You may want to use whole sheets of heavy construction paper for just one large numeral.)

You will need these things for the extra activities:
- pegboards and pegs
- paper plate
- some circular shape like a curtain ring or a bangle bracelet

name _____

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PURPOSE: Introduction to the ordinals: first through fourth; last.

Guess What I See. Challenge them to use their imaginations. Choose a child to describe one of the objects on the page. But he may not actually name it. The others try to guess what he is describing. They may describe real objects in the room also.

lesson Pages 39, 40

goal **Survey** – vocabulary and ability to recognize shape, size, and position

memo The objects in the picture were selected with the hope that you would have the same sort of things in your classroom. It is hard for children to pick out objects from a picture that has so many things. If you have trouble with the page, switch to using similar objects in the classroom.

page 39 This is a discussion page. You may wish to have pupils mark the answers to certain questions.

Ask questions about each of the following sets: the pictures, the children, the plants, the chairs, the books. Focus the questions as follows: Which is tallest? Which is shortest? Which is first? last? How are they alike? How are they different? Are there more ____ than ____?

goal Identifying the first, the second, the last, right, and left

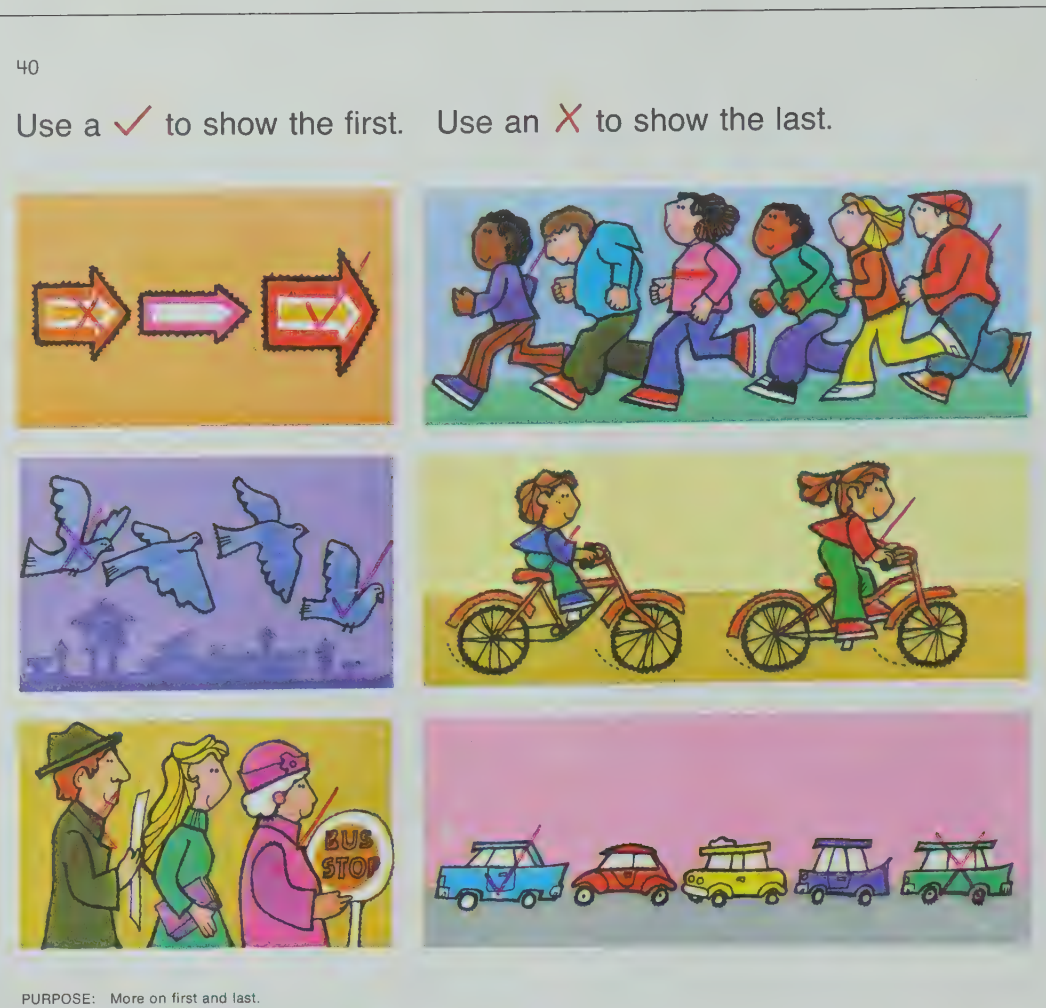
warm-up Teach LEFT and RIGHT by showing the children how to greet each other. *We always shake hands with the right hand.* Let them practice greeting each other until they know their right hand. *What's the other hand called?*

Examine a book. Talk about the page on the left and the page on the right. You can reinforce this idea when in the hall—the left side of the hall, the right side.

Call 4 children to the front of the room. Have them line up and face left. *Who's **first**? Who's **second**? Who's **next**? Who's **last**?* Now tell the children to turn and face the **opposite** wall. Repeat the questions.

page 40 *Are the signs pointing to the left or to the right? Are the boys running to the left or to the right?*

Establish the direction of movement for each picture. Use first, next, and last to identify the rows. Pupils should work independently once they understand how they are to mark each picture.



Play hand games to provide more practice with left and right. You may want to turn this into a Simon Says. *Point to the left, the right. Hold up your right hand, your left. Tap your leg with your right hand. Put your right hand on your left knee.*

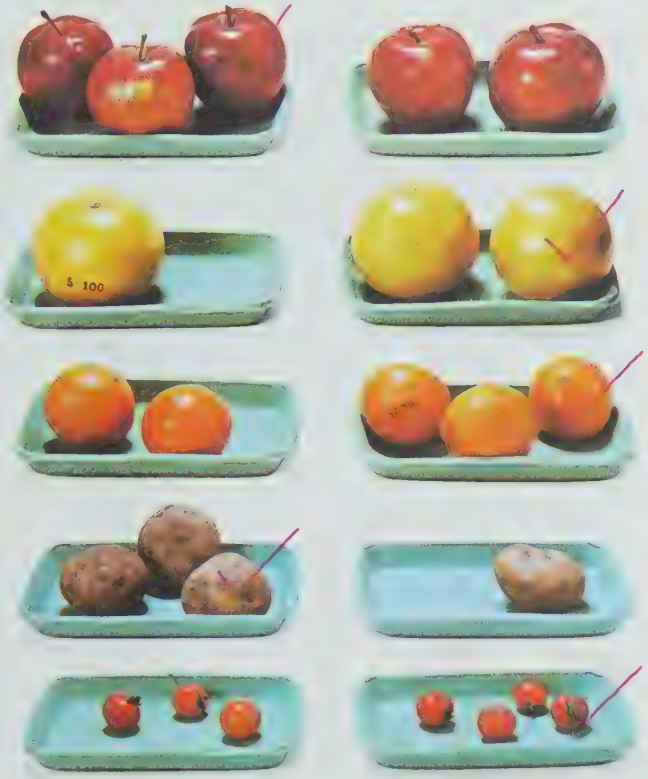
things old magazines and newspapers

Children hunt for pictures of people or animals and cut them out. They sort them into two groups: (1) those going to the left and (2) those going to the right. Finally, they paste the pictures on the paper.

41

name _____

Use a ✓ to show which has more.



© 1974, SRA

PURPOSE: Review—which has more; exploring shape.

lesson Pages 41, 42

goal Exploring the shape and size of objects; deciding which set has more

memo The shapes used on this page are all round and have CURVED SURFACES.

page 41 Compare the number of things pictured in the two sets in each row. Emphasize position on the right or on the left.

What fruit is in the trays in the first row? How many are in the set on the left? in the set on the right? Make a check mark on the set that has ***more.*** Pupils complete the page independently.

After checking the page, have the pupils look at the whole page. *How are all of these objects* ***alike?*** (Shape; can eat them) *Are they* ***different*** *in any way?* (Size, color) *How many sets of one can you find on the whole page? How many sets of two? of three? of four? How many sets have more than 4 objects? more than 1 object? Which set would you rather have?*

Make 2 rings on the board. Have a child draw a set in 1 ring. When he finishes, have another child draw a set that has one less in the other ring. *How can we be sure that it has one less? Who can prove it?* Let a child show matching.

goal Exploring the shape and size of objects; deciding which set has less

memo Each shape on this page has a curved surface and two FLAT surfaces.

things cans (various sizes)

warm-up Compare real-world cylinders for likenesses (a curved surface, 2 flat surfaces) and differences (size around, height, decoration). Distribute the cans so that the pupils can feel and compare.

Do these cans feel (or look) *alike? Tell how. Do they feel* (or look) *different? Tell how.*

Group several cans into two sets—each set no greater than six.

How many in this set? in this set? Which set has ***less?*** *How can we be sure? (Matching)* Repeat with similar examples.

page 42 *How are all the things in the sets alike? different? Look at the first row. Which set has less? Mark it.* Continue for the remaining sets.

After completing the page, look down a column. Have the children find the set with the most objects. Then have them find the set with LARGEST containers. Search again for the set with the SMALLEST containers.

42

Use ✓ to show which has less.

PURPOSE: Review—which has less; exploring shape.

Vary the activity from page 41. Have the second child draw a set that has one more in the other ring. Use the same line of questioning.

name _____

How many?

Draw one more.

How many now?

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PURPOSE: Review of one-more; exploring shape and size.

See activity, page 52a.

lesson Pages 43, 44, 45

goal Exploring the shape and size of objects; review of one-more

memo The shapes on this page all have flat surfaces.

things boxes of various sizes

warm-up Give the pupils boxes to examine. Look for likenesses (flat surfaces) and differences (size—height, length).

page 43 Complete at least the first problem together. The youngsters' drawings will not be perfect.

Look at the whole page. How are all the things in all the sets alike? different? Which box would hold the most?

goal Showing one-less

memo The art on this page is two-dimensional. The children don't know the proper name for a triangle or a rectangle. There is no need to introduce them now. Rather, talk about shapes with CURVED SIDES, shapes with STRAIGHT SIDES. Have them count how many straight sides.

things flannel board
felt pieces (geometric shapes)

warm-up Show a set of six on the flannel board. Ask a child to show a set that matches it.

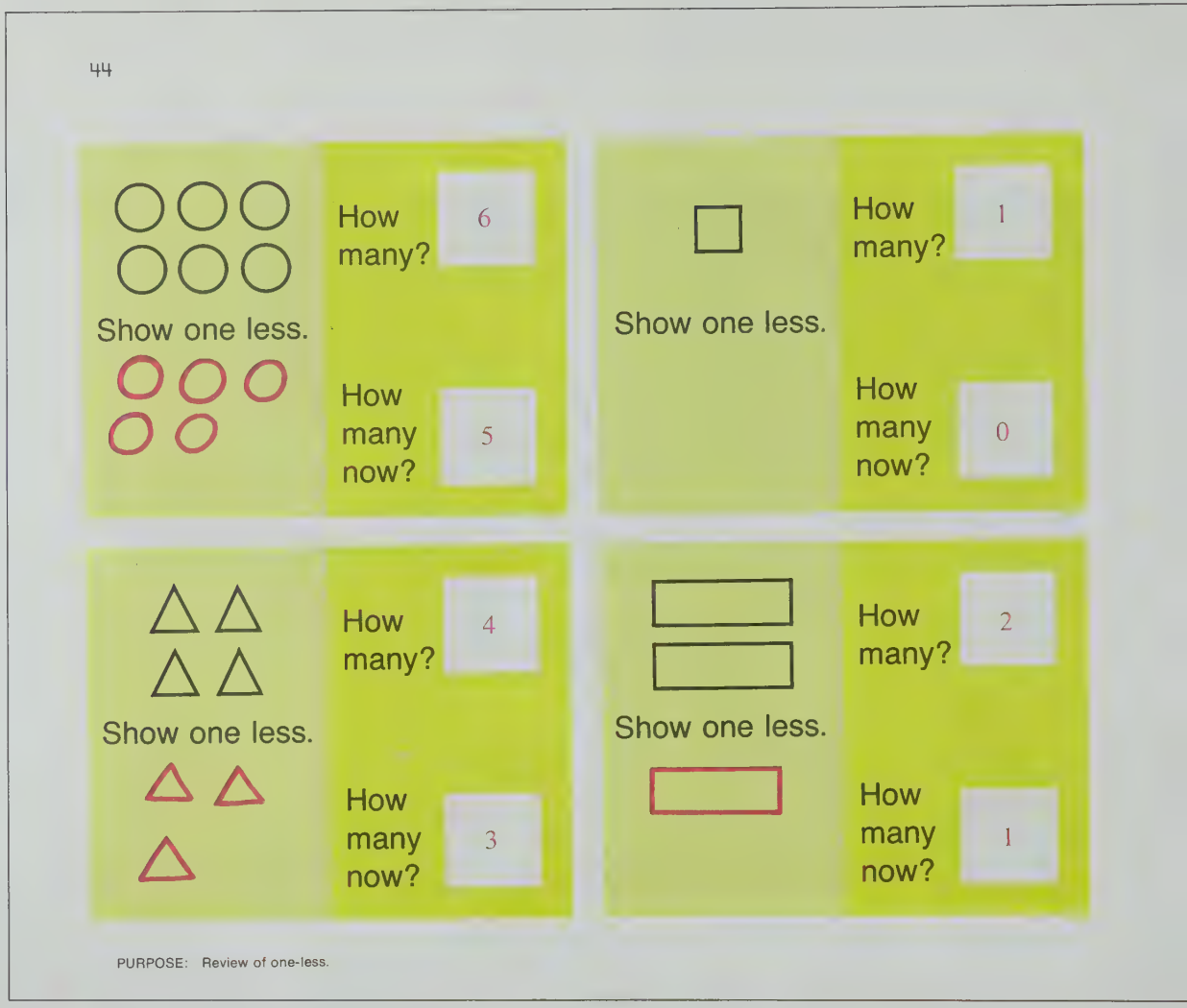
Do these sets match? How can we be sure? Remove 1 object from one of the sets. *Do the sets still match? How can we be sure?*

Repeat with other sets if more practice is necessary.

page 44 Do the first problem together.

Children who are able may complete the page on their own.

Now go back and look at the whole page. Ask how each set of objects is different from the other.



things game board, beanbag, counters (activity 1, page 52a)

Back to the game board and beanbag. Today the player gets a counter if he names the number that is one less.

name _____

Use ✓ to show which has the most.

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PURPOSE: Review—which has the most; exploring shapes.

goal Exploring the shape of objects; deciding which set has the most

memo Notice that each set (except the first) has one each of the basic solid shapes—ball (sphere), can (cylinder), and box (rectangular prism). You may have some fun sorting out stuff around the room into these three classifications.

page 45 You'll have to judge who can work independently and who will need help.

After the page has been completed, go back and ask which set in each column has more. This set can be marked with an **X.**

things various size empty boxes and cans

Mix the empty containers in a large box. The first job is to sort the containers into sets that are alike in shape. Then fit one container inside another until all the containers in any set are fitted within each other.

things geometry junk boxes

Using the junk boxes, challenge the youngsters to find things that have at least 2 flat sides and things that have no flat sides at all.

lesson Pages 46, 47

goal Exploring the sizes of similar objects; deciding which set has the least

memo Solid shapes are pictured again. Notice that the first row has 3 different sizes of boxes; the second row, 3 different sizes of balls; and the third row, 2 different sizes of cans. The last row has at least 3 sizes of each of the 3 shapes. If your class is ready, you may have some fun with this.

page 46 Pupils who have a good grasp of **matching** and of **least** should have no trouble with this page.

Look at the first row. How many in the first set? in the second? in the last? Which set has the least? Make a check by that set.

Complete the page by working each row. Then examine each row as follows.

Are the sets in this first row alike in some way? (Boxes—flat surfaces) *How are the sets different?* (Number, size) *Which set has the* ***smallest*** *boxes? the* ***largest*** *boxes?* Continue for the other rows if appropriate.

46

Use ✓ to show which has the least.

PURPOSE: Review—which has the least; exploring shapes and sizes.

things sets from page 45 or 46, paper, scissors, paste

Have the children cut out the sets along the set outlines and sort them. *Put together the things that belong together.* Give no other directions or hints. Let this be their thinking. These can be pasted on paper. Discuss the results.

You may want to practice order of numbers by having them paste the sets in order from least to greatest. Ordering from greatest to least is a real challenge.

name _____

What comes between? Draw the set. Write the numerals.

© 1974, SRA PURPOSE: Review of order.

goal Introduction to the concept of between; review of order

memo The same three basic solid shapes continue in the art.

things concept cards and numeral cards for 0 through 6

warm-up You will need to introduce the word THIRD. Have 3 children form a line facing the class. *Who's first? second? **third?** Is the third one also last? Who's* BETWEEN (name) *and* (name)?

Change the group and use 4 children. Repeat the questions. *Is the third one last now?*

Switch to the concept cards. *Put your set of three on the left. Put your set of five on the right. Show me the set that fits in between.* (Four) *Now match a numeral card to each of these sets.*

Continue to work with the idea of between. Use four and six, two and four, zero and two, one and three.

page 47 Give as much assistance as is necessary. The children have to do two things—draw the set and write the numeral. That's a big job! Watch out for the last row.

things game board (activity, page 52a)

Get out that game board again. (Why not use the sidewalk and chalk if weather permits?) This time make it a hopping game. Each child gets a chance to hop from one number to the next number in order.

Write the following on the chalkboard. Pupils fill in the missing numerals. Let them use their concept and numeral cards to check.

a. 0 _ _ 3
b. 3 _ _ 6
c. 2 _ _ _
d. 1 _ _ _
e. _ _ _ 5
f. _ _ _ 4
g. _ _ 3 _
h. _ _ 4 _

lesson Pages 48, 49

goal Exploring shape and size; review of order of numbers

memo Be careful not to confuse counting beads with writing the missing numerals. Otherwise there will be trouble with the first bead in the first row.

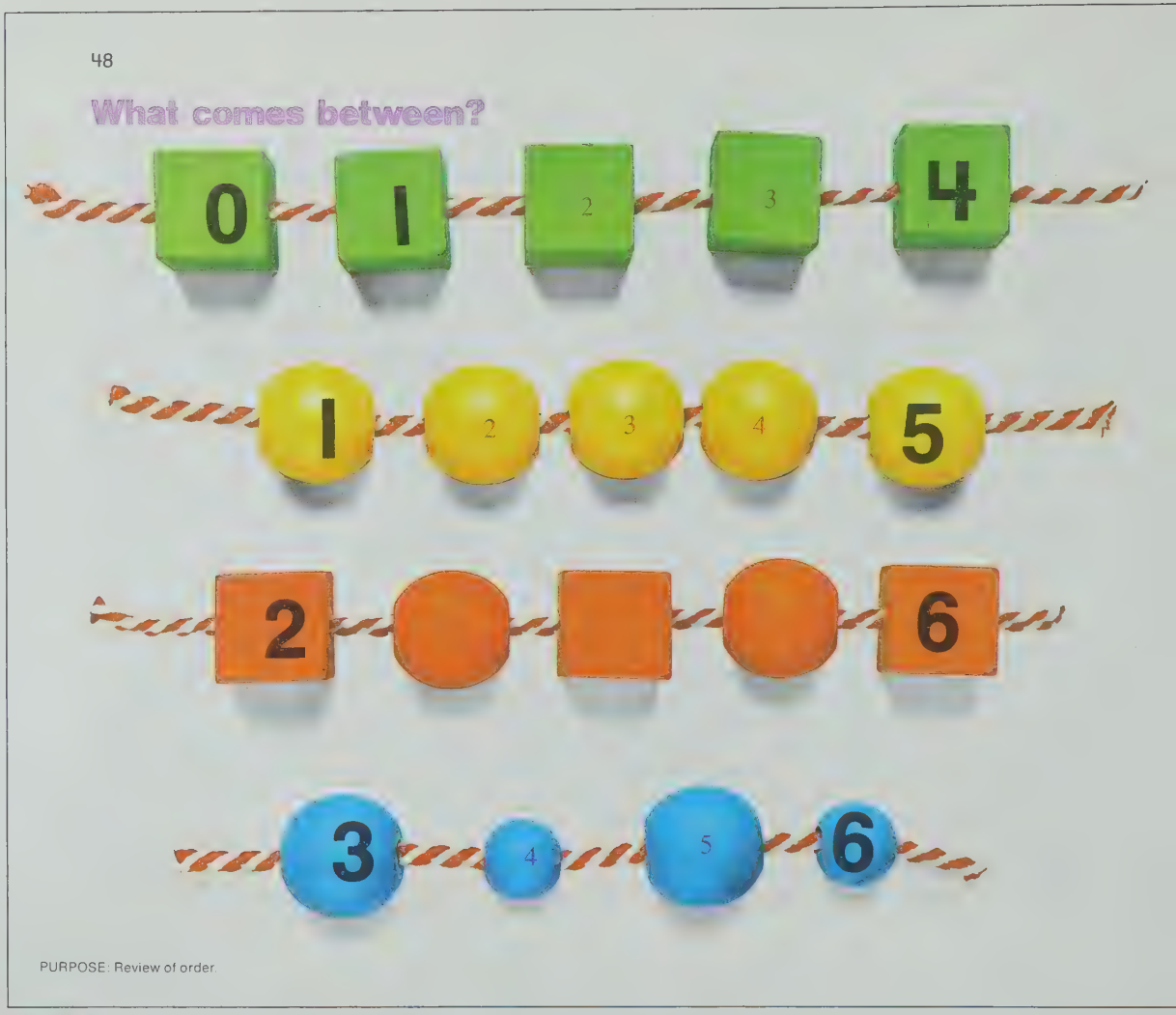
things large numeral cards, 0 through 6

warm-up Put numeral cards on the chalk ledge. Have one pupil hold the card for 3; have another hold the card for 6.

What is a number that comes between 3 and 6? Come up, take the card, and stand between. Continue until there are pupils holding the cards for 3, 4, 5, and 6. Go further by asking what number comes before and what number comes after 4.

page 48 *Look at the first string of beads. How many beads are there? What numerals are written on the beads? Are there some numerals missing? What numerals belong between 1 and 4? Write them on the beads.* Children who are capable may complete the page independently.

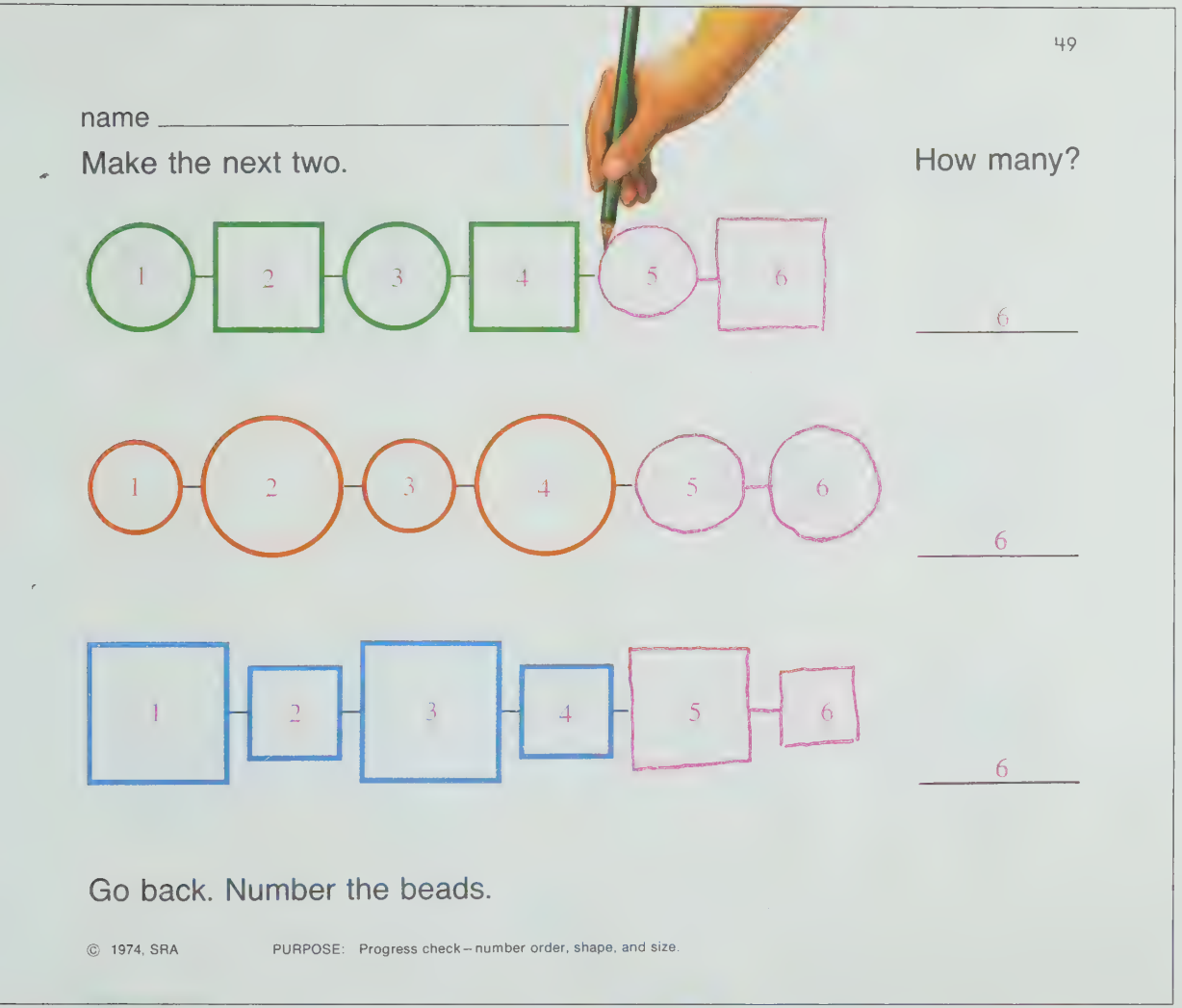
Go back. Talk about the shape and the size of the beads in each row. Look for shape and size PATTERNS.



things pegboard, colored pegs

Begin with a one-row color pattern, using the pegs. Have the child match the pattern. (Example: red, green, blue, yellow, red) Move to a color-number pattern (example: red, blue, blue, green, green, green).

Give individuals the opportunity to make up a pattern and challenge someone with it.



goal **Progress check** – number order, shape and size

warm-up Have the children form a line, alternating girl, boy, girl, boy.

Do you see a ***pattern*** *in this line? Should a boy or a girl come next? And then?*

Try a short-tall or standing-sitting pattern. Focus on telling what comes next, rather than on verbalizing the pattern.

page 49 **Careful!**

The page contains three separate directions. Do one at a time.

Look at the first row. What shape of bead do you think should come next? Make it. What shape of bead should come next? Make it. How many beads are there in the whole row? Write that number under ***how many.*** Continue with the remaining rows.

Complete the page by having the children number the beads in each string.

things snap-together (colored wood) beads

Snap several beads together to begin a pattern. Have pupils add at least 2 more beads. The easiest patterns repeat both color and shape. After several examples, have pupils make their own patterns and challenge each other.

things geometry junk boxes

Pick out shapes and build a pattern. The pattern might be based on size, shape, texture, color, or a combination of them. Find someone to tell you what the pattern is.

lesson Pages 50, 51, 52

goal Determining that a cylinder has a curved surface and flat surfaces

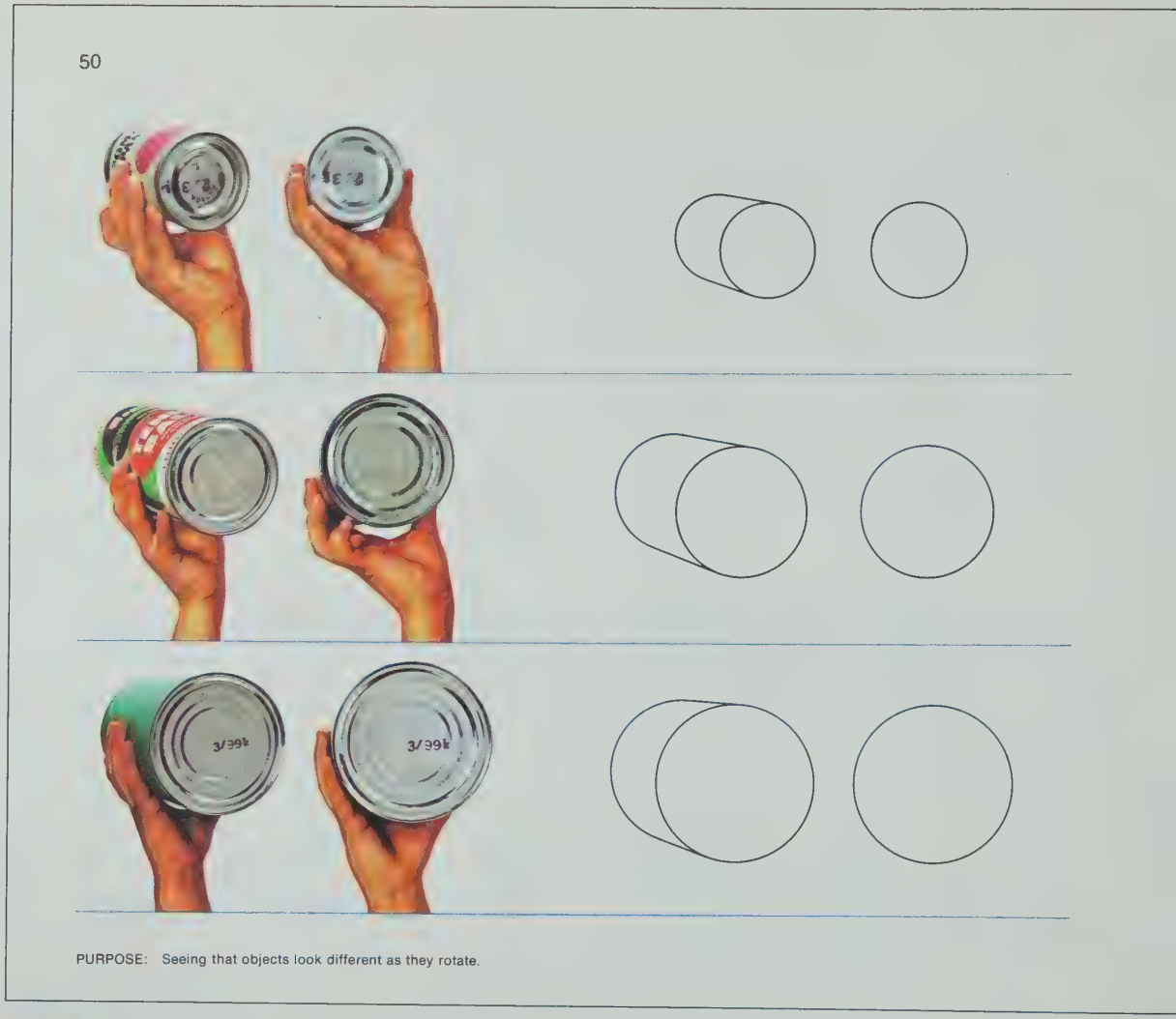
memo No formal geometry is being taught. Children are simply reaching conclusions from their experiences with real-world objects. Pages 50 and 51 are a discussion guide only.

things various cans—orange juice, vegetable, coffee

page 50 Group pupils. Hand out as many cans as possible to each group. Encourage each child to hold a can, look at it, turn it, and talk about it. Have each group decide which surfaces are alike and which are different. Redistribute the cans among the groups and repeat.

Can you turn the can so that you see only a CIRCLE? (Open end of can) *Can you find another circle by turning the can?* (Edge of closed end) *How are the two ends alike?* (Flat, curved) *Are the ends like the side?*

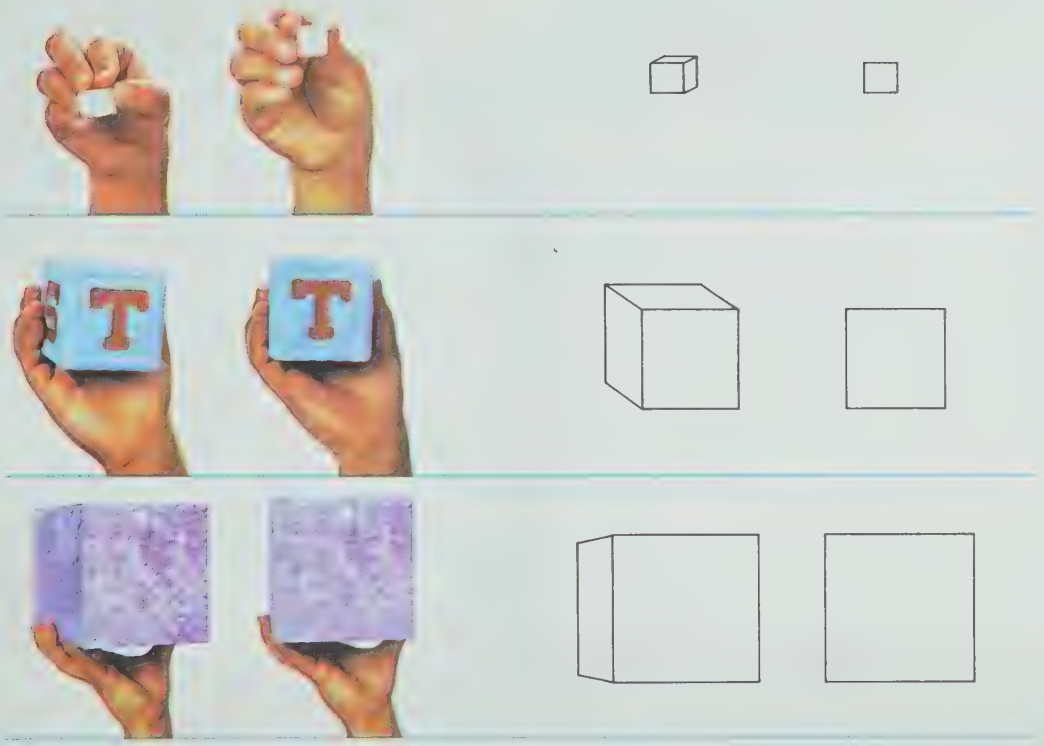
Are all the cans the same size? Does each can have one curved surface? any flat surfaces? How many?



things bracelet (ring kind), paper plate, ball

How are these alike? How are they different? All are round. The bracelet is flat, round, empty in the middle. The ball is round all over. *Is the middle empty? Could it be full?* The paper plate is round, with the middle filled in.

name _____



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PURPOSE: Finding flat surfaces on solid objects.

goal Determining that a box has flat surfaces

things small boxes

warm-up Use groups again. This time distribute boxes. Hands-on experience with the boxes is important. Have the groups decide how the boxes are alike and how they are different.

Are all the boxes the same size? Do our boxes have curved surfaces? flat surfaces? How many flat surfaces?

page 51 Ask similar questions about the objects shown on the page.

things rectangular-shaped frame, one side of a box, a box

How are these alike? How are they different? All have straight sides. The frame is flat, has 4 corners, and is empty inside. One side of the box is flat, has 4 corners, and the middle is filled in. The box has 8 sharp corners and each side is flat, but the whole box is not flat—it stands up.

How many sides come together at each sharp corner of the box?

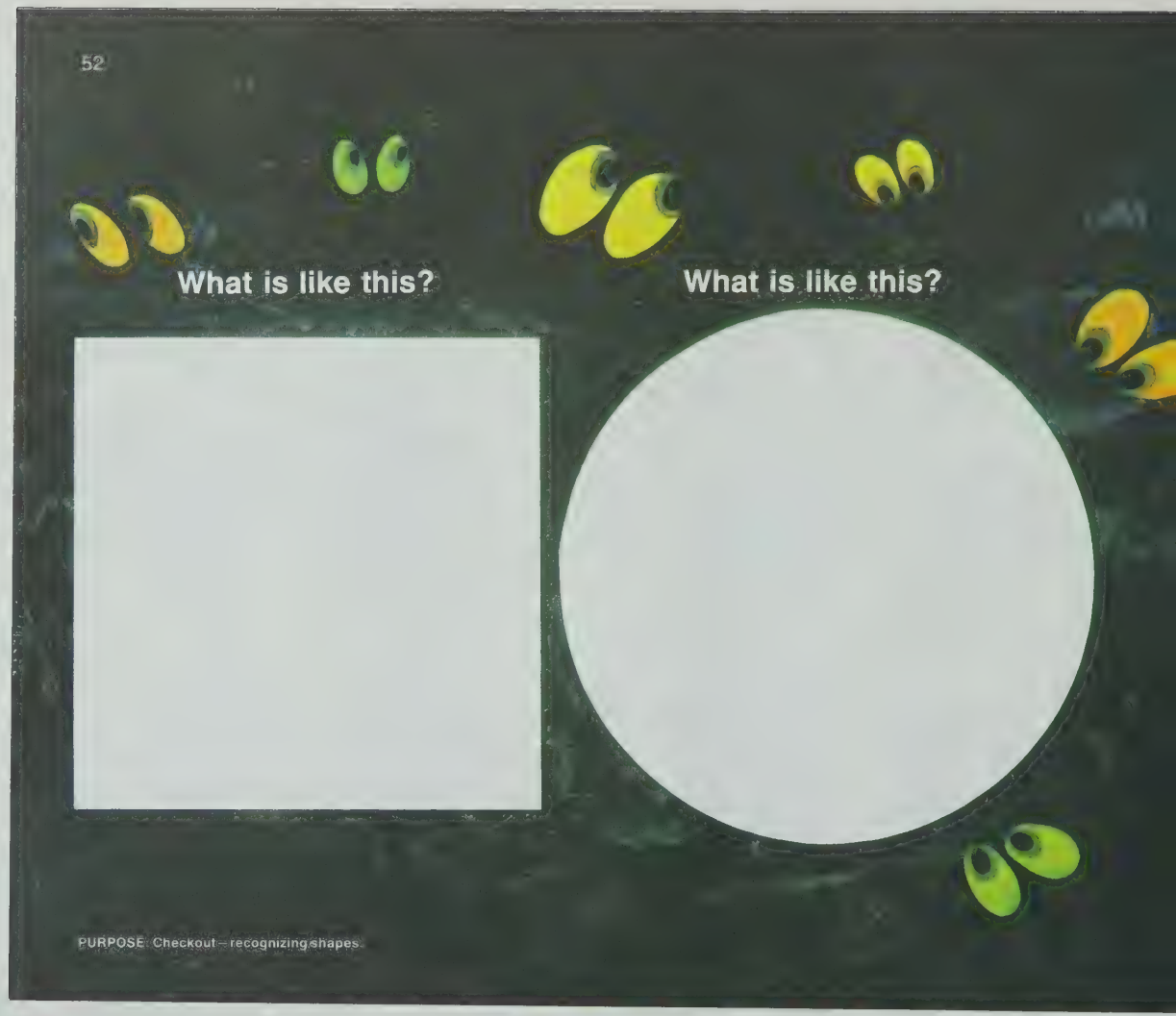
goal **Checkout** – identifying objects that have like surfaces

memo Youngsters may work on this page for several days. It would be great for them to hunt for shapes at home too.

things various sizes of boxes and cans placed around the room

page 52 Have each pupil find an object that has a surface that is the same shape as one of the shapes on the page. Then have each find something with a surface that matches the other shape. Size is not important – only shape.

This activity lays the foundation for later work in geometry. There the pupil will focus on shapes (two-dimensional) made with straight lines and on shapes made with a curved line. These shapes will be made by tracing boxes and cans.



things box containing jar, plastic glass, round-face clock, wood block, milk container, and so on; cardboard models formed by tracing a can and a box

Place circular model on a desk and square on another. Job: sort objects into sets with a surface that could produce the model.

things junk boxes, paper

First job: arrange some of the things on paper to make a pattern. Second job: trace the things; then put them back in the box. Challenge someone to find the things that fit the tracing.

RESOURCES

another form of evaluation

for progress check—page 49

You will need 3 each of 2 different-sized sheets of construction paper plus 3 circular shapes. (All pieces should be the same color, please.)

Spread the pieces out on the table. Ask the child to pick one piece of paper and put it in front of him. Then you put a different shape next to his. Ask if it is the same shape as his. His turn. He should pick the same-size shape as he first picked and put it in the row. Then he gets to find the same-size shape you picked. (He gets your turn!) You complete the pattern. Scoop up and hide the other shapes. Now have him tell you about the pattern of shapes he sees.

Start over. This time you build a pattern. Ask him to tell you about it. Then it is his turn to build a pattern. You tell him about it. Make a mistake. Let him correct you.

for checkout—page 52

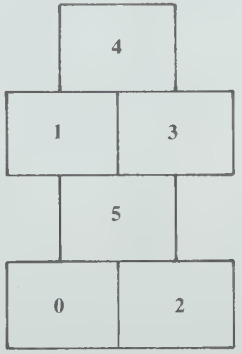
The pupil should have his pupil page 52. You should have a paper bag filled with shapes.

Go through the junk boxes and find buttons, jar lids, plastic covers, paper coasters, bottle caps—just anything and everything that is round. Also find box lids, a file card, a tile—just anything that has straight sides and corners. Dump everything in a paper bag. The pupil is to put his hand in the bag, pick one object and, before he takes it out of the bag, decide which of the two shapes on his page the object will be most like. He should take the object out of the bag and see if he was right. Continue until the bag is empty.

activities

things large piece of cardboard, felt pen, counters, beanbag

Make a game board with 6 sections. Tape it to the floor. A player tosses a beanbag. He gets a counter if he can name the number that is one more than the number the bag is on. He gets another toss. If the beanbag lands in the same square or if he gives a wrong answer, it's the next player's turn. The one with the most counters wins.



additional learning aids

concept— chapter objectives 2, 3, and 4

SRA products

Inquisitive Games: Exploring Number and Space, SRA (1967)
Colored-Stick Activities: 1, 2, 3, 4, 5
Mathematics Involvement Program, SRA (1971)
Cards: 31, 61, 71, 101, 62
Skill through Patterns, level 1, SRA (1974)
Spirit masters: 3, 4

other learning aids (described on page 128d)—Alike Unalike Books (set 1), Attribute blocks, Color & Shape Bingo, Cuisenaire* Rods, Pattern Cards for Stringing Beads

notation— chapter objective 8

other learning aids—Matchmates, Numberite, Stepping Stones, Unifix (blocks and 1–10 stair trays)

*Registered trademark of Cuisenaire Co. of America, Inc.

letter to parents

Dear Parents,

You can play a game with your child to find out whether he's reached our goals for the past weeks' study of math. Get seven pieces of paper. Ask him to write the numerals 0, 1, 2, 3, 4, 5, and 6 on them (one on each piece of paper). This will show whether he can write the numerals correctly. Then use each sheet to wrap up some pennies, pieces of candy, raisins, or anything that your youngster likes. In some packages, make the number of objects equal to the number on the wrapper. In others, make the number of objects less than or more than the number on the wrapper. Hide the packages (not really necessary, but it adds to the fun). The rules of the game are that your child gets to keep the stuff in a package if he can tell you how many objects there are and if this number is the same as, less than, or greater than the number on the wrapper.

I asked your child to bring an egg carton to school. Why? We're going to make a *ten-tray* by cutting off the lid and two cups at one end. This is a device that will be used in our next lessons. It's hard for children at this age to understand that our system of numerals is based on groups of ten; so we take lots of time to let them find out on their own. The first step is developing the numbers seven, eight, and nine. You can use a ten-tray at home to play a "I'll bet I can fool you" game. Use something to eat as counters (raisins, hard candy, peanuts, and so on). Put a number of pieces into the ten-tray (only one piece in each cup) and tell your child the number of pieces you put in. Sometimes say the correct number; sometimes say a number that is one more or one less than the number you put in. If he says, "You can't fool me; you put in ___" (the correct number), he gets 1 point. As soon as he earns 20 points, he has won the game. His prize is right there in the ten-tray ready to eat.

You'll be able to help in the next weeks by pointing out the numerals 0 through 9 in the newspaper, in magazines, on food packages, and postage stamps. Ask your child to name each symbol.

Please continue to make numbers important at home too. Ask "How many?" every chance you get. Your cooperation is appreciated.

3 NUMBER CONCEPTS 7-9

before this chapter the pupil has—

1. Counted sets of zero through six and recorded how many
2. Ordered the numbers 0 through 6

in chapter 3 the pupil is—

1. Developing number concepts for seven through nine
2. Writing how many in sets of zero through nine
3. Ordering the numbers 0 through 9

in later chapters the pupil will—

Count, say, and write the number of members in a set of zero through one hundred

Notes & Things

The study of number continues in the chapter to include development of the numbers seven, eight, and nine. The emphasis is still placed on the answer to the question "How many?" Counting from a number is introduced in this chapter. If a child can count the number of objects in one set, remember that number, and then count from that number to another number, he has taken a big step that will make the operation of addition much easier. It is surprising how difficult this task is for a child. This type of exercise will be repeated many times in later chapters; so if everyone doesn't get the job done now, don't worry. There will be lots more opportunity.

The ten-tray is used a great deal. Some children will come to recognize a standard configuration of counters and will automatically say the numbers with no need to count at all.

Continued work with the formation of numerals is also featured. It is hoped that by the end of this chapter each pupil will be able to make a legible numeral for each of the numbers 0 through 9.

The study of order of numbers and the relation between two numbers also continues.

words

Practically all number-concept words introduced so far are reviewed, and only a few new concept-development words are introduced:

- seven
- eight
- nine

things

ten-trays for everyone
counters
index cards for pupils to make concept cards
numeral cards for 7, 8, and 9
all the concept and numeral cards already made

name _____

Seven leaping leopards
Dressed in spotted suits
Played the seventh symphony
On seven shiny flutes.

7 7 7 7 7 7 7

Draw **7** numerals. Look for other good answers.

1 2 3 4 5 6 7

© 1974, SRA PURPOSE: Introduction to seven.

lesson Pages 53, 54, 55

goal Development of the concept of seven; writing how many in a set of seven

warm-up Show 6 objects. Count them aloud with the class. Add one more object. *Now how many?* Count to SEVEN several times. Change the activity slightly. Keep the 7 objects but count to 3 and stop. *How many? Let's* ***count from*** *3 to 7.* (4, 5, 6, 7) Point to each object as you count it. Repeat. Count to 5, then **from** 5 to 7. Count to 1, then **from** 1 to 7. Counting from a number to another number will be used often to get ready for addition.

page 53 Read the rhyme. Count the leopards.

How many leopards? This is how we write 7. How many leopard tails? Draw one more. Now how many tails? Write how many.

Continue with how many flutes, leopard noses, the number of words that begin with *s* in the rhyme, as well as sets of seven within the classroom.

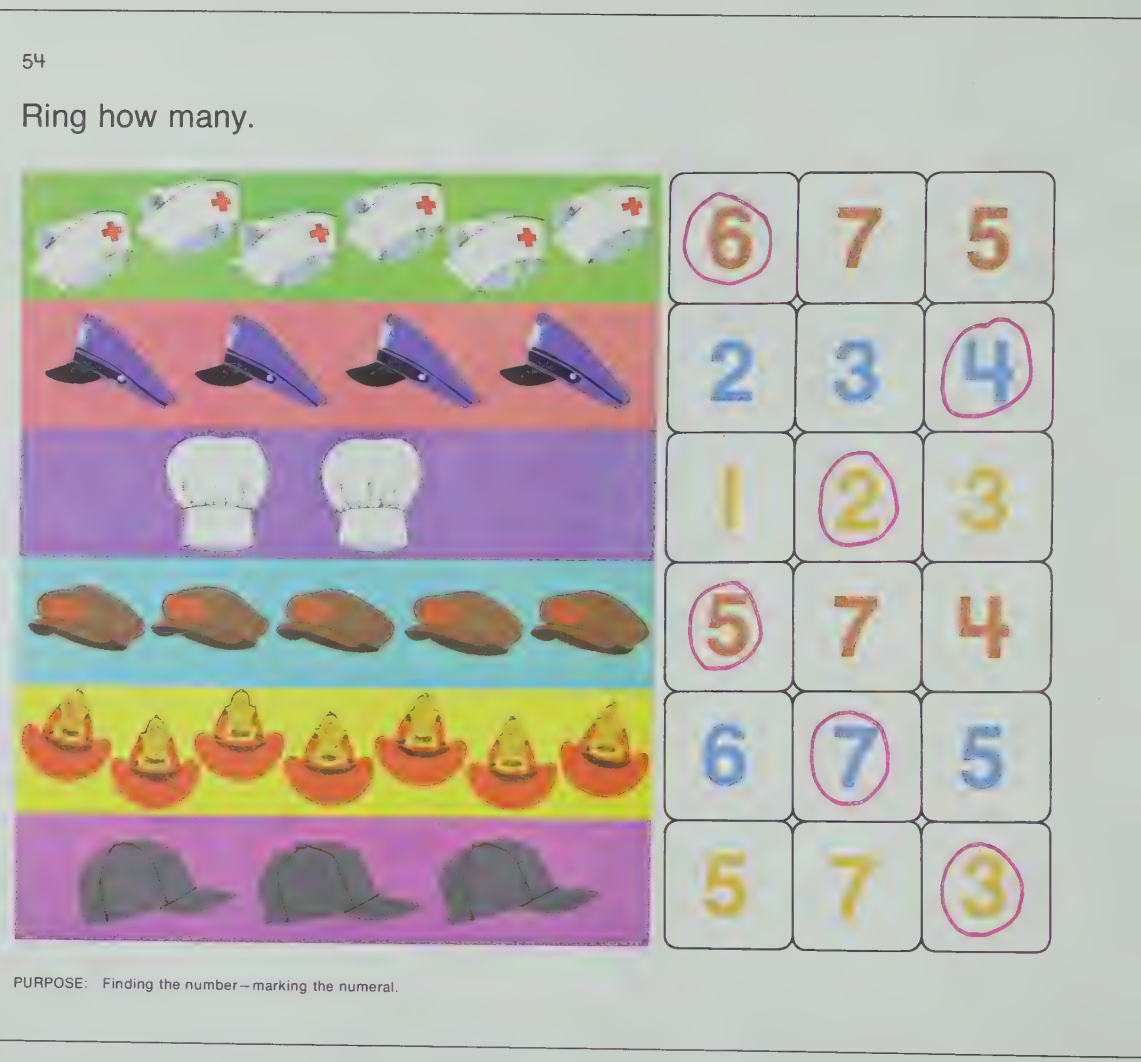
goal Matching a numeral with sets of two through seven

things for each pupil:
5″ x 8″ index card
numeral card for 7

warm-up Hand out index cards. Have pupils make a concept card for seven. Distribute numeral cards as a reward for such beautiful sets of seven.

page 54 Hats! Hats! And more hats! The children should be able to give you the directions for this kind of page. Have them work independently.

You'll want to talk about the different kinds of hats and who would wear each kind—policeman, chef, and so on.



name _____

How many? Practice writing here.

0	1	2	3	4	5	6	7	8

© 1974, SRA PURPOSE: Writing how many; recognizing order.

goal Counting and writing how many in sets of zero through seven; order of numbers, 0 through 7

page 55 There's no new concept here, so challenge the pupils to tell you the directions. Assign the additional writing practice to only those pupils who need it.

STOP

things for each pair of pupils: 7 counters

Pair the pupils. One child separates the set of 7 counters into 2 groups. The other child tells how many in one group, and then counts **from that number** to 7. Pupils alternate roles.

lesson Pages 56, 57, 58

goal Development of the concept of eight; writing how many in a set of eight

things for each pupil:
ten-tray
counters—2 colors

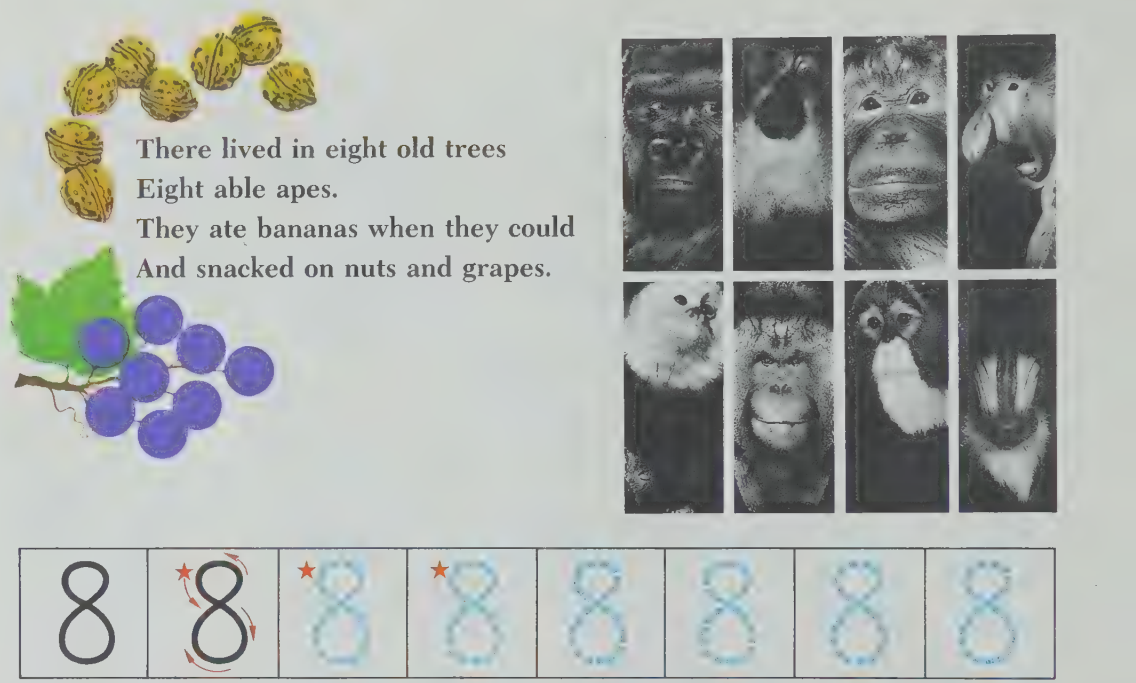
warm-up *Show a set of seven. Use counters of the same color. Show one more with the other color. Now how many?* (EIGHT)

Make a set of four with one color of counter. Show four more with the other color. How many in the first set? (Four) *Count* ***from 4****—5, 6, 7, 8. How many?*

page 56 Read the rhyme

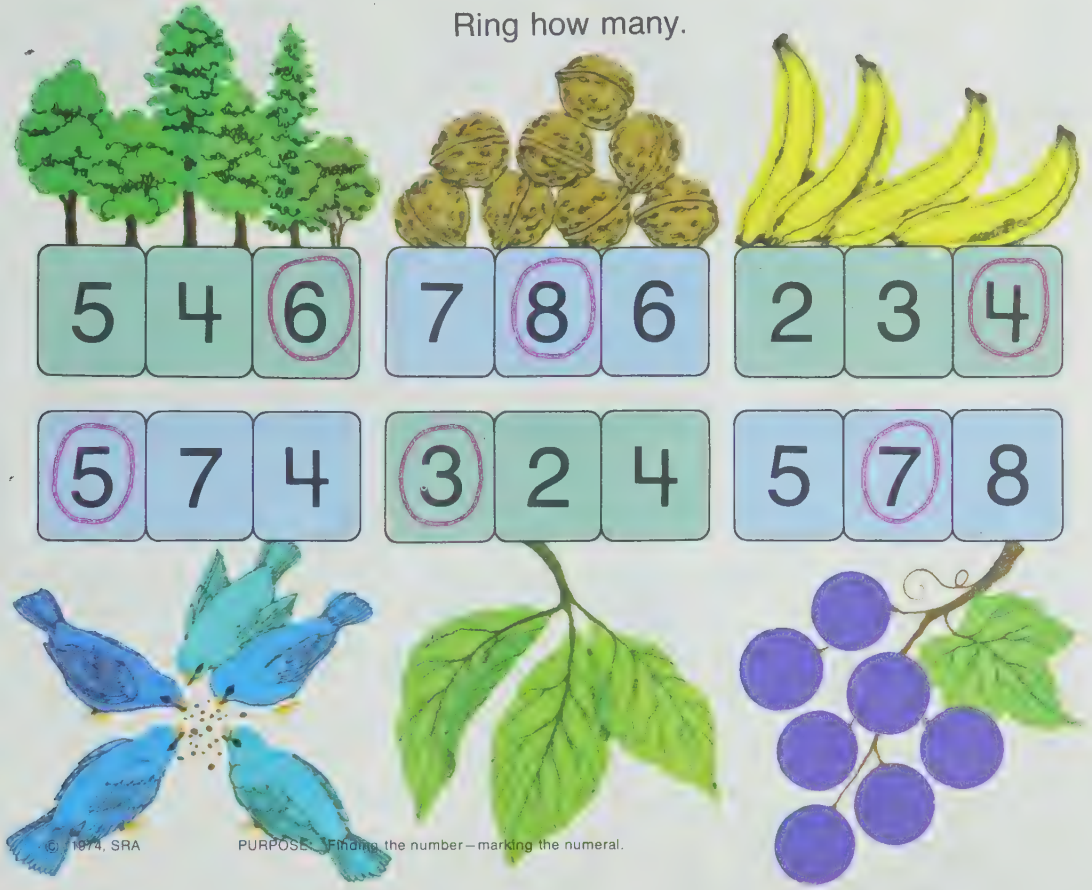
Count the apes. This is how we write the numeral 8. The direction arrows will take some discussing. *Count the grapes. Write how many. Count the nuts. Write how many.*

Count other sets of eight in the room for each numeral to be written. Count the number of eights written.


56
There lived in eight old trees
Eight able apes.
They ate bananas when they could
And snacked on nuts and grapes.
Draw 8 numerals.
Look for other good answers.
1 2 3 4 5 6 7 8
PURPOSE: Introduction to eight.

name _____

Ring how many.



© 1974, SRA

PURPOSE: Finding the number—marking the numeral.

goal Matching a numeral with sets of three through eight

things for each pupil:
5″ x 8″ index card
numeral card for 8

warm-up Have the children make their concept card for eight. Distribute numeral cards for 8. Work in pairs again. Have one partner shuffle all his concept cards. Have the other arrange them in order from least to greatest. Reverse roles and repeat, this time using the numeral cards. Was anyone fooled?

page 57 Review directions. Pupils should be able to work independently.

things for each pupil: ten-tray, counters—2 colors

Show five counters in 1 color. Show one more. Use the other color. Now how many?
Continue with six and one more, two and one more, and so forth.

goal Writing how many in sets of one through eight

memo On the preceding page the children showed that they can count and pick the numeral to tell how many. Emphasis here is on writing the numeral.

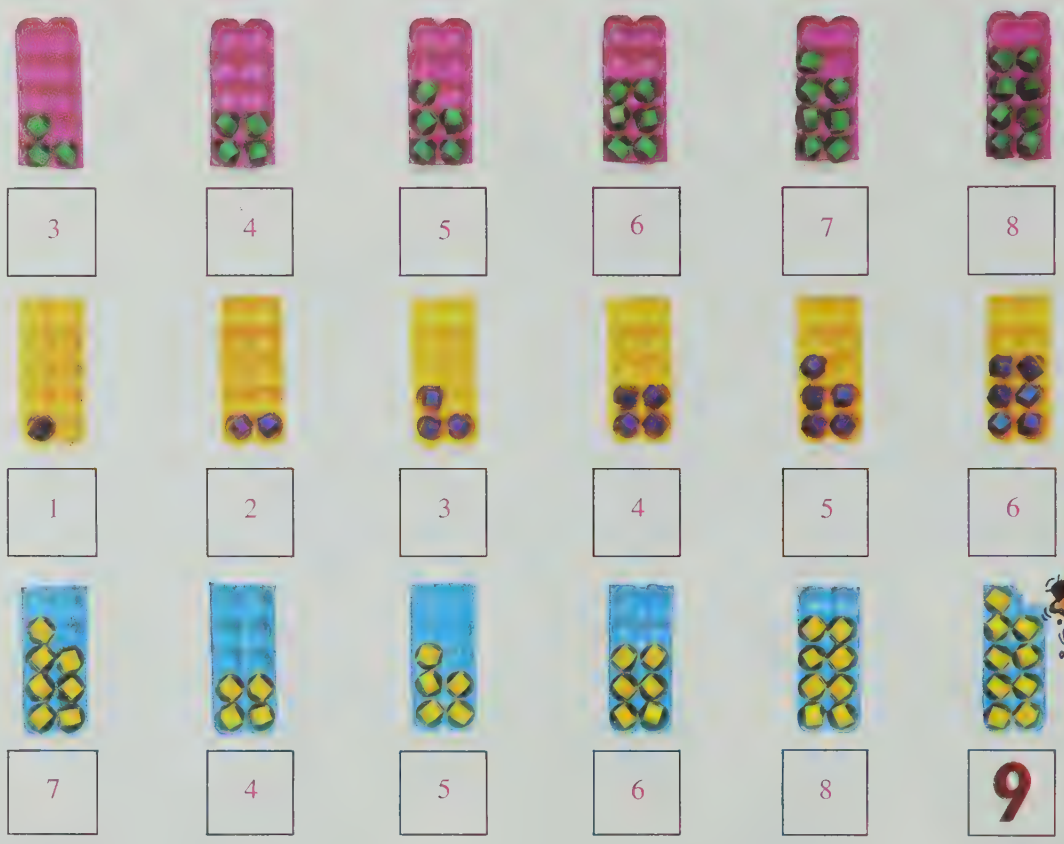
things ten-tray
counters

warm-up Sketch a ten-tray on the chalkboard. Show a real tray with counters. Explain that you will show the counters on the board by using a dot for each counter. Count how many. Have someone come up and write how many. Repeat with more examples until the pupils accept the chalkboard drawing of the ten-tray and counters and until they confidently write the numeral. Assign helpers for those who have some trouble. You can supervise those you expect to have lots of trouble.

page 58 Do the first two or three problems together. Have pupils work independently as they are ready.

58

How many?



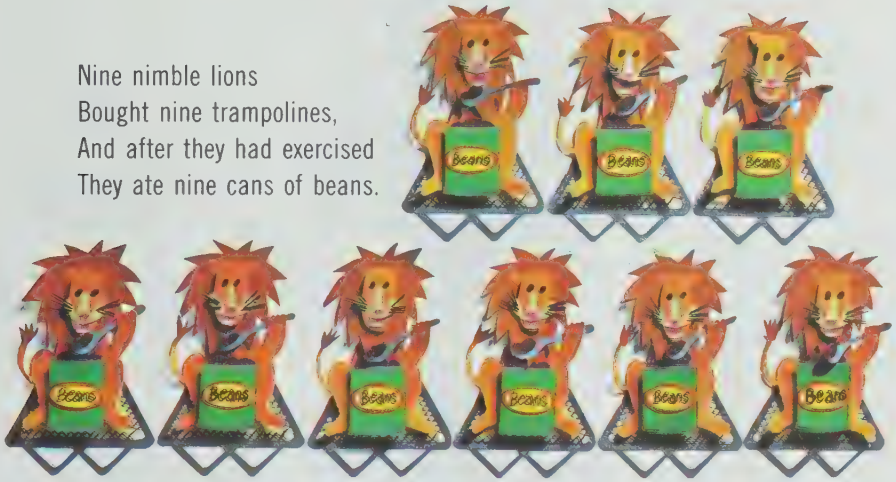
PURPOSE: Review of numbers.

things ten-trays, counters
for each pupil: numeral cards 0 through 8

Show a set of four in the ten-tray. Ask how many. Have pupils hold up a numeral card to tell how many. Repeat for other numbers.

name _____

Nine nimble lions
Bought nine trampolines,
And after they had exercised
They ate nine cans of beans.



Draw **9** numerals. Look for other good answers.

1 2 3 4 5 6 7 8 9

© 1974, SRA PURPOSE: Introduction to nine.

lesson Pages 59, 60

goal Development of the concept of nine; writing how many in a set of nine

warm-up Show 8 objects. Count them aloud with the class. Add one more object. *Now how many?* (NINE) Count to nine several times. Keep the 9 objects but count to 5 and stop. *How many? Let's count* ***from*** *5 to 9.* (6, 7, 8, 9) Point to each object as you count it. Repeat. Count to 7, then **from** 7 to 9. Count to 2, then **from** 2 to 9.

page 59 There's nothing new here. Proceed as on similar pages.

goal Matching a numeral with sets of four through nine

things for each pupil:
5″ x 8″ index card
numeral card for 9

warm-up Each makes a concept card for nine. Work in groups of three. The first person should get out his set of concept cards; the second person picks a card and writes how many; the third person is the judge. Right or wrong? When three are written correctly, switch jobs. Give numeral cards as a reward for the children's hard work.

page 60 A most familiar type of page! Pupils should be able to proceed independently.

60

Ring how many.

PURPOSE: Finding the number—marking the numeral.

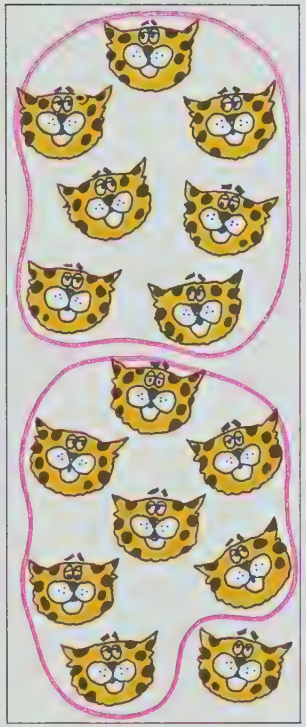
things for each pair of pupils: 9 counters

Pair the pupils. One child separates the set of 9 counters into 2 groups. The other child tells how many in one group, then counts **from that number** to 9. Pupils alternate roles.

name _____

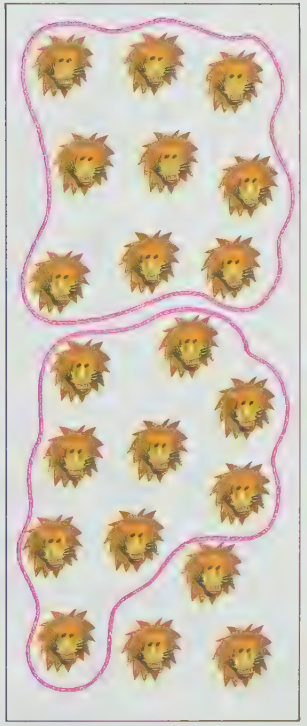
Look for other good answers.

Ring sets of **7**.



Ring sets of **8**.

Ring sets of **9**.



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PURPOSE: Review of seven, eight, and nine.

things concept and numeral cards 0 through 9

Pair the children. One should have his numeral cards, the other his concept cards. The first player shows a numeral card; the second matches with his concept card. Continue 1 full round of cards. An error? The player takes a counter. Change roles. Whoever has fewer counters wins.

lesson Pages 61, 62, 63

goal Making sets of seven, eight, and nine

page 61 *Look at all those leopards! Count 7 leopards and make a ring around them. Are there more? Count another 7 leopards and ring them.*

Repeat the procedure for the remaining columns.

goal Practice in writing numerals; review of order of numbers, 0 through 9

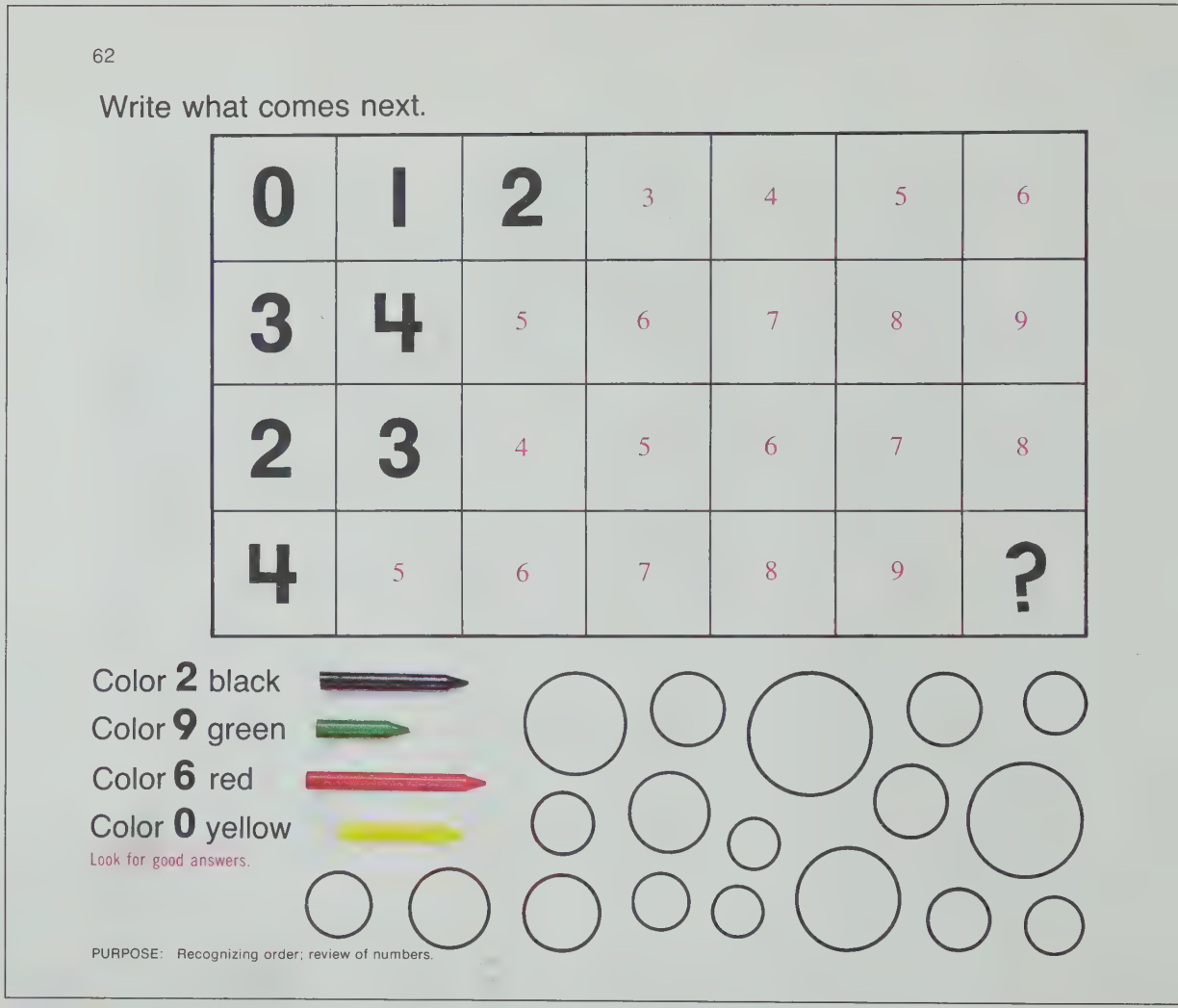
things for each pupil:
numeral cards, 0 through 9

warm-up Have pupils mix up their numeral cards, then race to get them back in order. Choose several assistants to check the order. If the children are seated at tables, sets can be matched to check order.

page 62 Get them started. *Find zero. What comes next?* As soon as they know what to do, make this an independent activity.

Note that one bubble at the bottom of the page should remain uncolored. Don't tell! Let them discover this for themselves.

When the page has been completed, use it for further questioning. *How many times did you write the numeral 1? 2? 3? What numeral did you write the most? What numeral tells the largest number?*


62
Write what comes next.
0 1 2 3 4 5 6
3 4 5 6 7 8 9
2 3 4 5 6 7 8
4 5 6 7 8 9 ?
Color 2 black
Color 9 green
Color 6 red
Color 0 yellow
Look for good answers.
PURPOSE: Recognizing order; review of numbers.

See activity 1, page 64a.

name _____

How many?

7

9

8

7

6

9

8

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PURPOSE: Checkout—numbers 7, 8, and 9.

See activity 2, page 64a.

things for each group: 10 ten-trays, 45 counters

Have children work in small groups. They are to put the counters into the trays so that no 2 trays have the same number of counters.

goal **Checkout**—counting and writing how many in sets of six through nine

page 63 Once directions are clear, this is independent work.

Benchmark! You've made all the way from 0 through 9

lesson Page 64

goal Fun with numbers

memo We all come in contact with numerals written in a variety of forms. Newspapers, storybooks, posters, street signs, and TV have numeral styles that are quite different from those in math books. Children should be able to recognize a numeral written in just about any style. Maybe this page will help. You will have time to work with those who need help while others do this page.

page 64 Follow directions as stated on the page.

64

How many **9**s
can you find? 9

How many **5**s
can you find? 9

PURPOSE: Fun with numbers.

Reserve some bulletin-board space for a collection of numerals. Have children go on a numeral hunt in old magazines and newspapers. Look for numerals that have some fancy shape—that look different from the numerals in their books. They cut out each numeral they find and then highlight it with a felt-tip pen. Do take time as a group to read these funny numerals.

RESOURCES

another form of evaluation

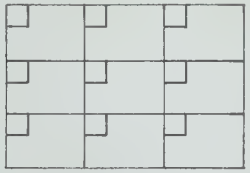
for checkout — page 63

The pupil will need a pencil and paper. You will need 4 small jars with caps, 4 small boxes or 4 envelopes, and at least 35 small counters (counting disks, kernels of corn, dried beans, or paper clips). 4 gummed labels would be helpful if you have them.

The pupil should put 9 objects in one container, 8 in the second, 7 in the next, and however many he wants to put in the last one. Oh, goodness! We forgot to label them to tell how many. How many are there in this container? Have him write the numeral to label it. Continue until the job is done.

activities

1. things for each pupil: 3 x 3 grid, counters

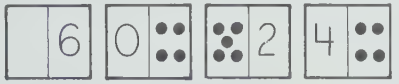


Prepare a spirit master as shown. The pupils are to write a numeral from 1 through 9 — in random order — in each small corner box.

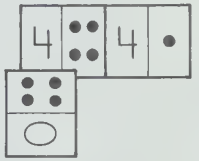
To play Numbero: Call a number from 1 through 9. The player finds the numeral and puts that number of counters in the larger square. Three across or three down wins. Winner calls the numbers for the next game.

2. things 5" x 8" index cards, gummed dots

(Small-group game) Divide each card in half with a line. Write a numeral from 0 through 9 on one half; stick dots on the other half. Make one "double" for each number and as many other combinations as you wish.



Shuffle the cards. Five cards are dealt to each player. The remaining cards are placed in a stack facedown. The dealer plays a double if he has one or draws a card from the stack. The turn passes to the next player. Continue until someone can play a double. From here on, the players must match a numeral to dots or dots to a numeral.



When a player is unable to match, he draws a card from the stack, plays that card, or includes it with his collection to be played. The next player continues. The winner is the first player to use all his cards.

additional learning aids

concept — chapter objective 1

SRA products

Inquisitive Games: Exploring Number and Space, SRA (1967)
  One to Nine Game
  Recognizing and Writing Numerals
Mathematics Involvement Program, SRA (1971)
  Card: 82
Visual Approach to Mathematics, level 1, SRA (1967)
  Visuals: 7, 8, 9, first and second suggested activities

other learning aids (described on page 128d) — Counting Blocks, Counting Chips, Counting Rods, Hainstock Blocks, Lots-A-Links, Match It Game, Number Boards, Unifix (cubes and number trays)

notation — chapter objectives 2 and 3

SRA products

Skill through Patterns, level 1, SRA (1974)
  Spirit masters: 5, 6

other learning aids — Beginners Number Poster Cards, Magic slates, Matchmates, Math Bingo, Numberite, Stepping Stones

letter to parents

Dear Parents,

We are going to start to find out what addition is all about. Put 2 spoons together with 3 spoons and let your child tell you how many in all. Please don't rush your child into knowing the addition combinations. You may think we are moving very slowly. We are. The idea of addition should be understood before there is a lot of work with flash cards. Addition is a big idea. Students are still learning about it in high school algebra.

You can continue to stress counting and take every opportunity to get your child to put sets of objects together. Three tall glasses and five short glasses on the table are how many in all? Four spoons and four forks are how many pieces of silverware in all? Two hamburgers and three hotdogs are how many sandwiches in all? It will be fun for your child to see that he can do the same things at home that he does in school.

Thanks again.

4 ADDITION AND NUMBER CONCEPTS 10-18

before this chapter the pupil has—

1. Counted sets of zero through nine and recorded how many
2. Ordered the numbers 0 through 9

in chapter 4 the pupil is—

1. Developing the concept of addition
2. Using the addition and equals symbols
3. Developing number concepts for ten through eighteen
4. Writing how many in sets of ten through eighteen
5. Ordering the numbers 0 through 18
6. Practicing addition facts with sums through 18
7. Using the horizontal and vertical forms for addition
8. Adding three numbers and using parentheses to show grouping

in later chapters the pupil will—

1. Count, say, and write the number of members in a set of zero through one hundred
2. Say and write the sum for any addition fact written in horizontal or vertical form
3. Add any two numbers whose sum is less than 100 and requires no renaming

Notes & Things

The operation of addition is introduced and numbers through eighteen are developed in this chapter.

Several pages are devoted to the concept of addition before any symbols are introduced. The operation of addition is presented as the action of bringing some number of objects together with another number of objects. The physical manipulation of objects is important. If this action can be completely understood and internalized, then there is something upon which other operations can be based. The children will be most anxious to tell you how many there are in all. That's great! That is a signal that they are ready to move ahead. The English word *and* is used first, and then the arithmetic symbol for *plus* is introduced. The word *is* is replaced by the equals symbol. (Isn't it surprising the care that is taken to introduce a multisyllabic word in reading and yet an abstract symbol such as + or = is frequently not bothered with at all? Goodness, not only does each of the symbols replace an English word but both have a very sophisticated idea behind them.)

It is very important to point out that addition is the means by which the numbers through eighteen are developed. The children are not asked to first rename $7 + 8$ as $(7 + 3) + 5$ to find the sum. Place value will be developed in a later chapter. The technique of counting from a number will be emphasized to get the sums through 18.

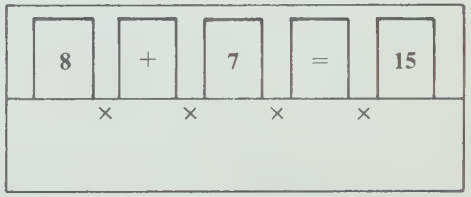
Please remember that mastery of all the addition number facts is not expected in this chapter, although every child should be confident about the combinations with sums of 10 or less. Think back on your own experiences with memorization tasks. For many people the length of time an idea is remembered is directly proportionate to the length of time they had to learn it. There is a lot of practice in this chapter, however. You may be delightfully surprised at how many facts the pupils do know at the end of the chapter.

The vertical computational form is introduced in this chapter, and there is some exploratory work with adding three numbers.

This is a very long chapter. If the pupils show fatigue, stop. Pick some of the activities that will give a few days rest.

things

As an aid, a sentence holder for each child can be made from strips of oaktag. Each × indicates where staples are needed to form pockets. Tape the outer edges. Make the numeral pockets wide enough to accommodate a 2-digit numeral card.



words

New concept-development words and phrases introduced in this chapter are listed in columns in the order in which they are orally used. Words that also appear on the pupil pages are marked with an *.

math symbol
plus
how many in all
equals
addition sentence
add*
word problems
ten*
dime*
penny*
eleven
combination
twelve
thirteen
fourteen
above*
below*
inside*
outside*
fifteen
sixteen
seventeen
eighteen
sum
grouped
grouping symbol

things

overhead projector and counters or flannel board and felt pieces
counters for each pupil
symbol cards for + and =
all numeral cards through 18
(The symbol and numeral cards were on that spirit master for chapter 1.)
1 set of large display numeral cards through 18
ten-trays for each pupil
at least 1 dime and 10 pennies
classroom pocket chart and blank cards for special markings
8 small boxes to hold number-fact cards
index cards on which addition number facts can be written

For the extra activities you will want to have these things available:
beads and wire
cubes for game pieces
old deck of playing cards (no face cards needed)

"If it's always four—don't you find this kind of boring?"

Off the Record by Ed Reed,
reprinted courtesy of The Register and Tribune Syndicate

name _____

Show more. Look for other good answers.

© 1974, SRA PURPOSE: Introduction to addition.

things game board, beanbag, counters (activity 1, page 52a)

Extend the game board to 10 sections. Include 6, 7, 8, and 9.

Begin by naming the number that is one more.

Switch to two more or five more, depending upon the abilities of your group.

lesson Pages 65, 66, 67

goal Introduction to the concept of addition

memo These activities, although very simple, teach the basic concept of addition. Children need to know the action before proceeding to the operation of addition. **Do not ask how many in all** at this time.

things for each pupil:
ten-tray
counters

warm-up *Hold up a finger of one hand. That's one. Hold up two more of the other hand. That's two more.* Repeat, varying the numbers.

Move the action into a ten-tray. Have them show 2 and 3 more, 6 and 1 more, and so forth. Do not ask how many in all.

page 65 For each ten-tray, the pupils will count how many dots are already colored and then color the number of dots indicated.

goal Introduction to addition as ___ and ___ more.

memo All early work with the concept uses an action model.

things overhead projector and transparent colored dots (or flannel board)

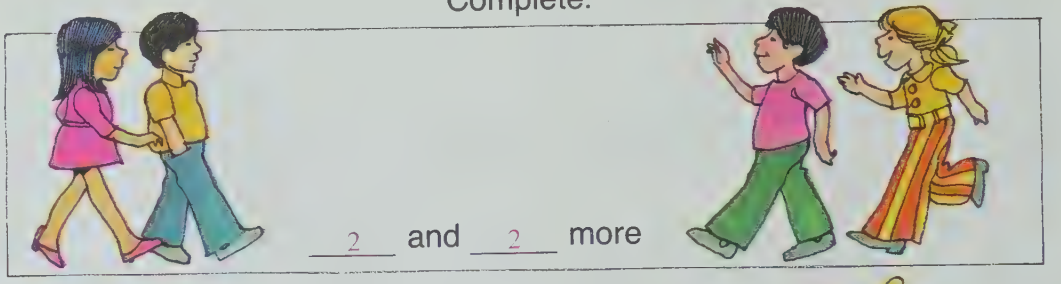
warm-up Make 2 sets. Slide the sets toward each other. Under the sets write: ___ and ___ more. Read the phrase so that the pupils know the words **and** and **more.** Have a pupil count the dots and record the action.

Continue, varying the number in each set, until the children are very good at counting and recording.

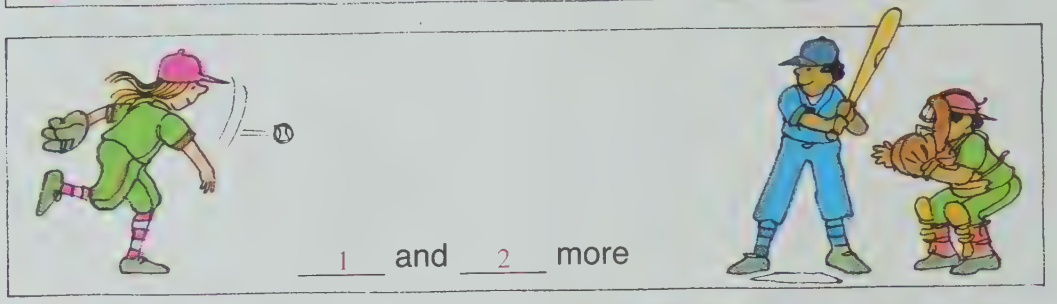
page 66 Pupils who have any trouble at all should take time out to work with real objects. They should always record the action using the form ___ and ___ more.

66

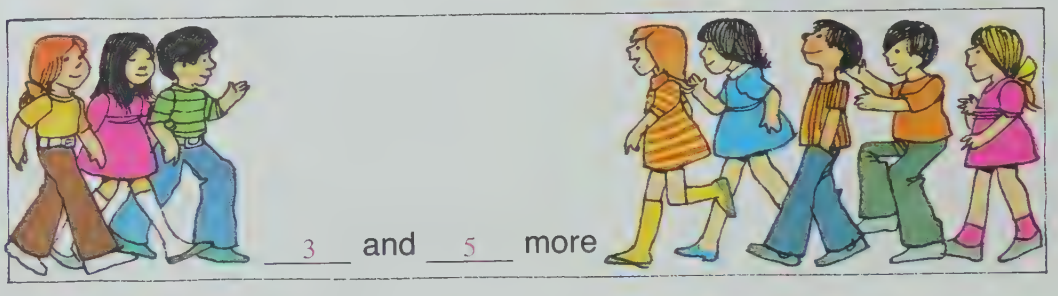
Complete.



2 and 2 more



1 and 2 more



3 and 5 more

PURPOSE: Introduction to addition (continued).

name _____

Complete.

6 and 2 more

1 and 1 more

7 and 0 more

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PURPOSE: Using another model for addition.

goal Development of the concept of addition as ___ and ___ more

page 67 Point to the bottles in the carton on the left, then to the bottles in the carton on the right. *How many bottles are in the carton on the left? Write that. And how many more? Write it.*

Discuss the action in the remaining pictures. Let the children complete the page independently.

lesson Pages 68, 69

goal Introduction to the addition symbol, +

warm-up Sketch on the chalkboard a sign familiar to your children.

What does this sign tell you to do? Why is this sign needed? Use other signs if you need to.

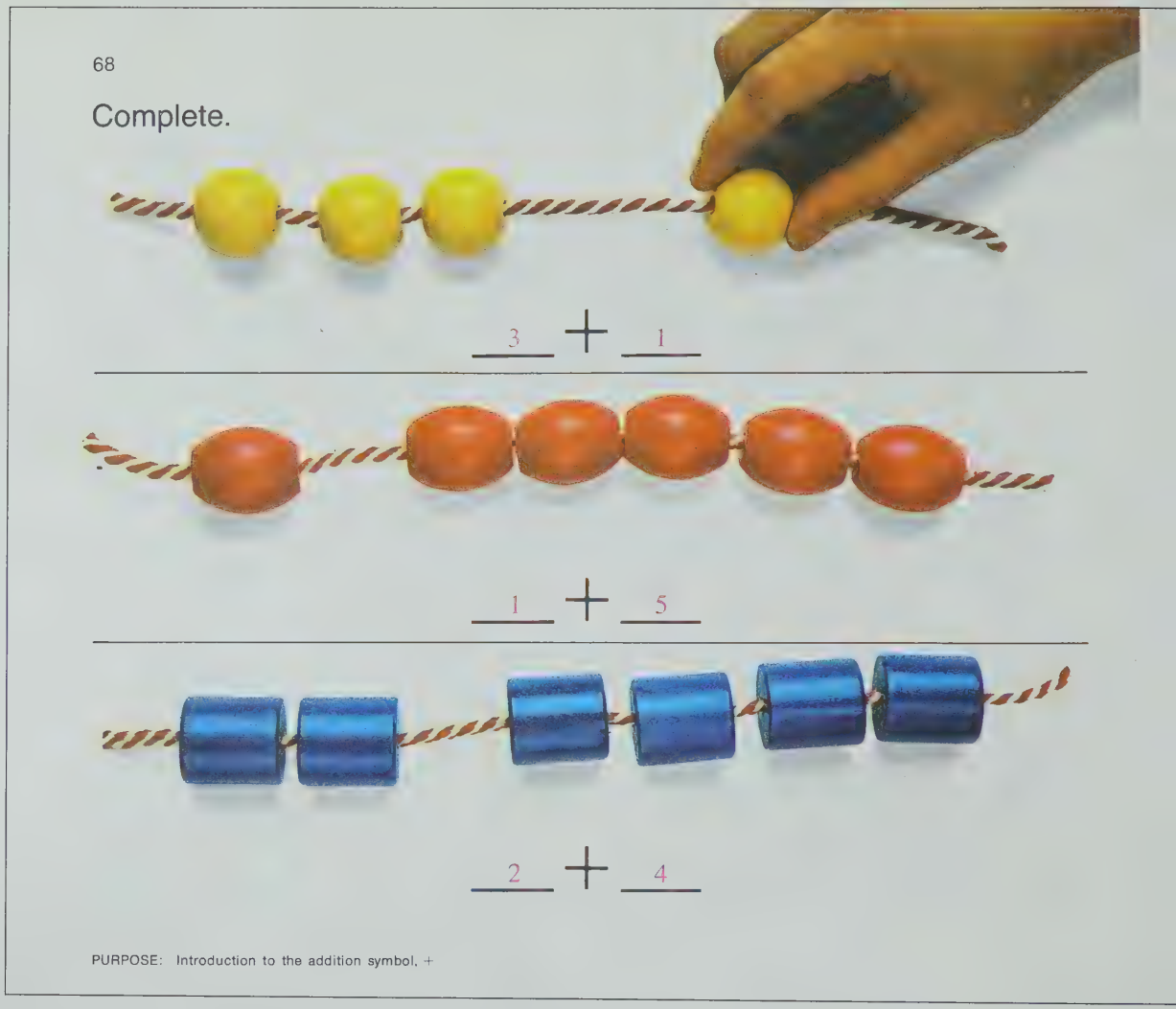
Here is a special MATH SIGN *we're going to learn to use.* Write +. *It's name is* PLUS.

Write ___ and ___ more on the chalkboard. Have 3 children stand. Record how many. Have 2 more children stand. Record.

We can write 3 and 2 more with the special sign. Erase **and.** Replace with +. Erase **more.** *We read this as 3 plus 2.*

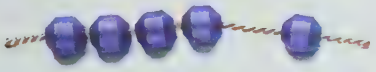
Continue with other examples of action models until the children can quickly record and read the statement.

page 68 Ask what they think they are to do on this page. This is independent work. No problems? Then continue right on to the next page.



name _____

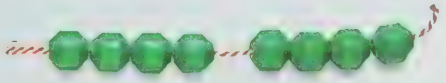
Complete.



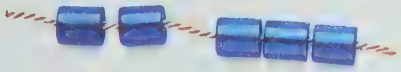
4 + 1

4 + 3

3 + 3



4 + 4



2 + 3

3 + 2

© 1974, SRA PURPOSE: Practice with the addition symbol.

goal Practice with the addition symbol

page 69 There's nothing new. Children who know the plus symbol should be able to go right on.

When checking, wonder aloud. *I wonder how many that is in all.* Don't push for an answer. Tomorrow is another day.

STOP

things for each pupil: 9 counters, +, and numeral cards

Pair pupils. One child shows 2 sets, using counters. The other child records the action under the sets with numeral cards and the plus-sign card. Pupils alternate roles.

lesson Pages 70, 71

goal Introduction to "How many in all?"

memo It's important to get all pupils into the habit of **counting from** how many in the first set in an addition situation. They want so desperately to start again and recount from zero to find HOW MANY IN ALL.

things for each pupil: counters

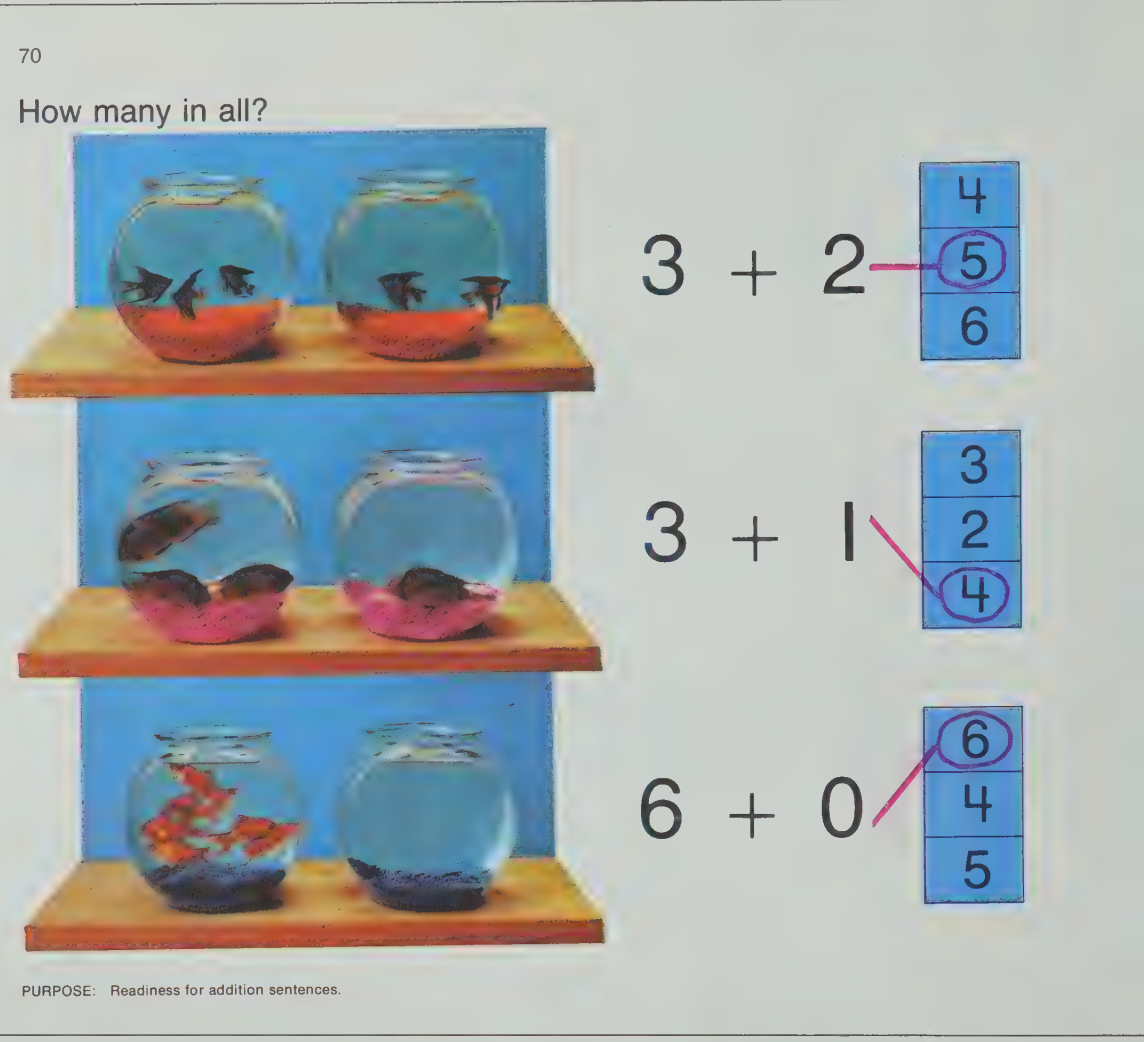
warm-up Have children show 4 counters and 2 more. *How many in all? How can we find out?*

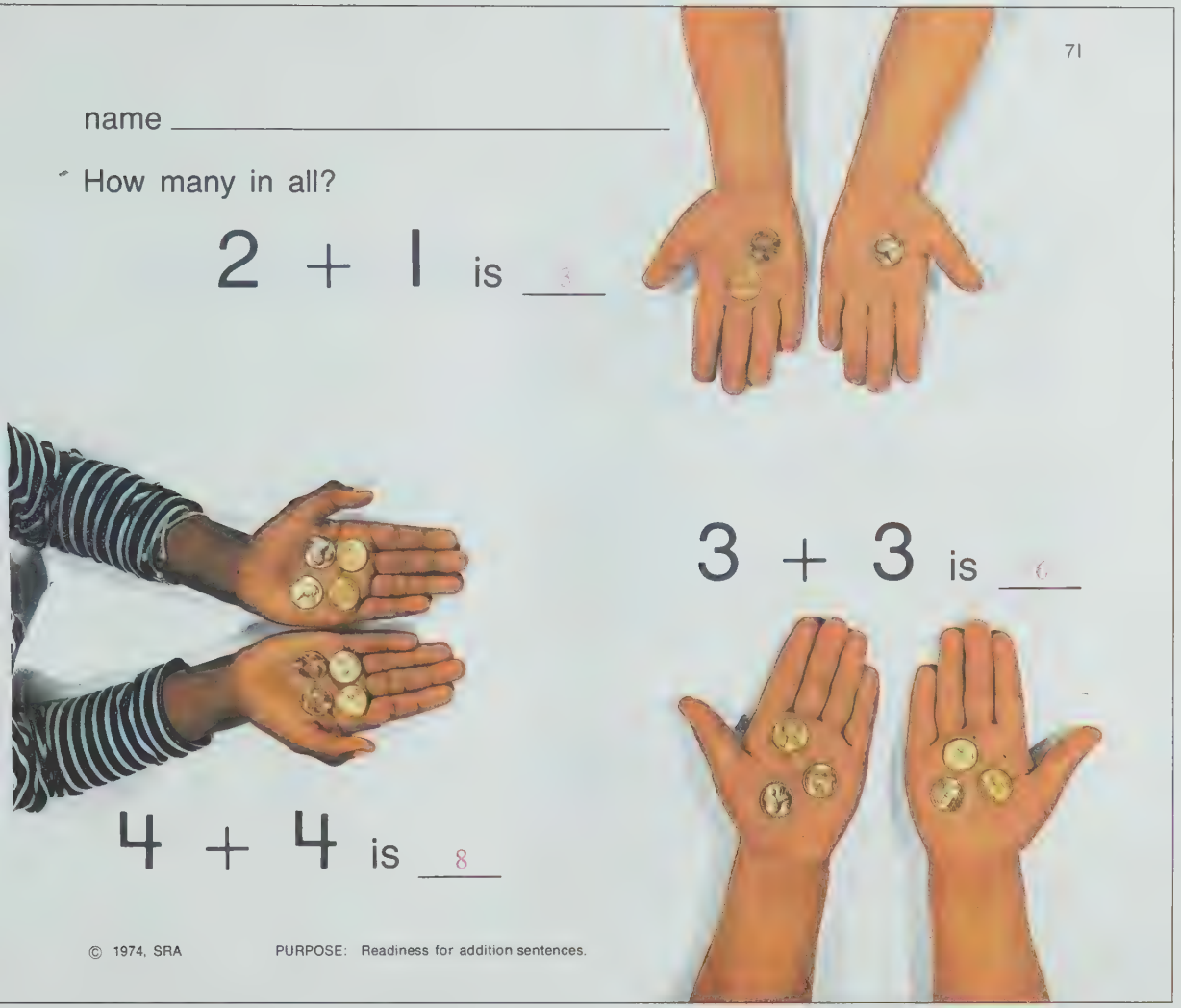
How many in the first set? (Four) *And there are more in the other set. Let's count to find how many in all. Count* ***from 4***—*5, 6. How many in all?*

Have patience in developing the skill of counting from a number. This technique requires much practice. Use it as a fill-in activity whenever possible.

page 70 *Look at the bowls on the top shelf. Somebody thinks there are 4 fish in all. Somebody else thinks there are 5, and someone else 6. How many* ***are there*** *in all? Count* ***from 3***—*4, 5. Draw a line from 3 + 2 to the 5.*

Continue counting from the first set to find how many in all and then drawing a line to the correct answer.





goal Introduction to IS; writing how many in all

memo Always emphasize counting from the number of the first set to the number in all. It really will help!

warm-up Pick an action model for $4 + 2$. Write

$4 + 2$ is ____

Ask how many in all. Write the numeral.

page 71 The Warm-up should take care of any directions necessary. This can be independent work.

lesson Pages 72, 73

goal Introduction to the equals sign

things ten-tray and counters
for each pupil:
+, =, and numeral cards

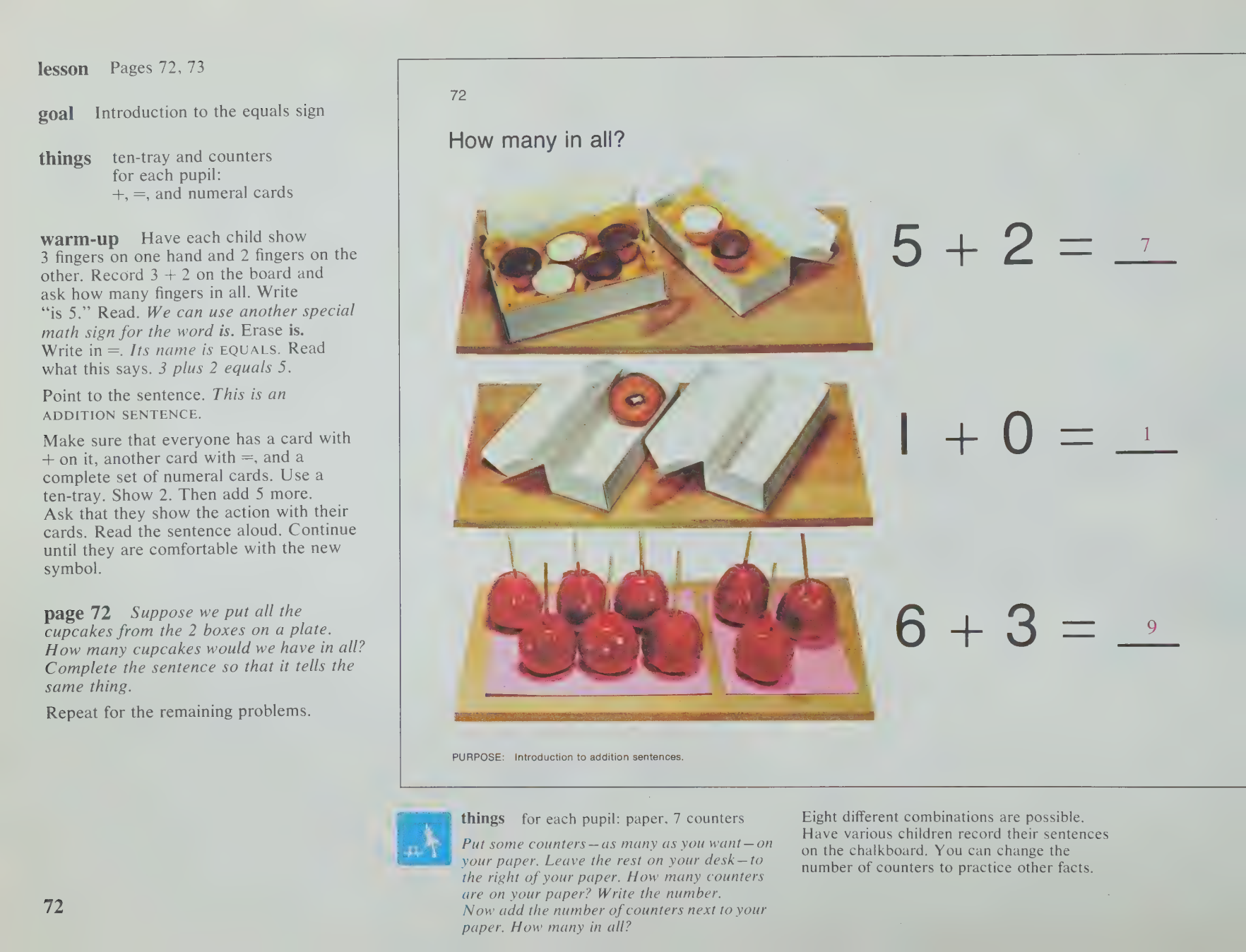
warm-up Have each child show 3 fingers on one hand and 2 fingers on the other. Record 3 + 2 on the board and ask how many fingers in all. Write "is 5." Read. *We can use another special math sign for the word* ***is.*** Erase **is.** Write in =. *Its name is* EQUALS. Read what this says. *3 plus 2 equals 5.*

Point to the sentence. *This is an* ADDITION SENTENCE.

Make sure that everyone has a card with + on it, another card with =, and a complete set of numeral cards. Use a ten-tray. Show 2. Then add 5 more. Ask that they show the action with their cards. Read the sentence aloud. Continue until they are comfortable with the new symbol.

page 72 *Suppose we put all the cupcakes from the 2 boxes on a plate. How many cupcakes would we have in all? Complete the sentence so that it tells the same thing.*

Repeat for the remaining problems.



things for each pupil: paper, 7 counters

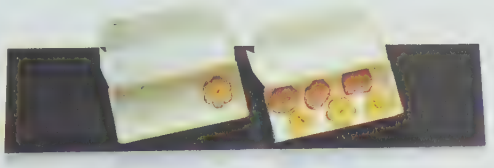
Put some counters—as many as you want—on your paper. Leave the rest on your desk—to the right of your paper. How many counters are on your paper? Write the number. Now add the number of counters next to your paper. How many in all?

Eight different combinations are possible. Have various children record their sentences on the chalkboard. You can change the number of counters to practice other facts.

name _____

Fill in the blanks.

4 + 3 = 7

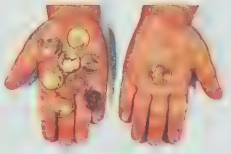


1 + 6 = 7

2 + 1 = 3

0 + 4 = 4

4 + 0 = 4



8 + 1 = 9

© 1974, SRA PURPOSE: Practice with addition sentences.

things for each pupil: numeral cards

Time for oral fun. *1 plus 1 equals how many in all?* Children hold up the card that tells how many in all. Do these in order or mixed up.

0 + 1	0 + 2	0 + 3	0 + 4
1 + 1	1 + 2	1 + 3	1 + 4
2 + 1	2 + 2	2 + 3	2 + 4

goal Writing addition sentences

things for each pupil:
+, =, and numeral cards
counters

warm-up Use the overhead projector or chalkboard as the children use counters and cards.

Show a set of one. Show another set with two. Under the sets write

___ + ___ = ___

What's missing?

Have a child write in the missing numerals while the others use their cards. Continue with this activity until the children feel at ease.

page 73 *What's missing on this page? How do you find the missing numerals?*

As pupils show they understand, let them work independently.

lesson Page 74

goal Addition practice with sums through 5

memo Let pupils know that they may use counters when no pictures are shown for a problem. The aim now is to make each child feel successful.

things for each pupil:
+, =, and numeral cards

warm-up Using classroom objects, show the action of an addition situation. Ask children to show the action with an addition sentence. Check answers by having them count from the number of the first set. Repeat the activity as long as enthusiasm is high.

page 74 *What shall we do with the loose beads? What will you do on this page? What is the big question?* (How many in all?)

When finished, check answers by counting from the first number. Let the children correct any mistakes.

Which was the hardest problem on the page? Write it on the board. There may be more than one. *Why was it hard?*

Practice the problem(s) as many times as possible during the day.

74

How many in all? 5

1 + 4 = 5

How many in all? 3

1 + 2 = 3

How many in all? 5

3 + 2 = 5

How many in all? 4

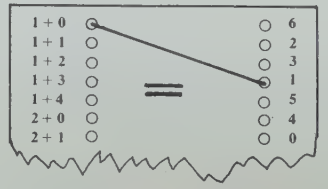
2 + 2 = 4

3 + 1 = 4 2 + 1 = 3 1 + 3 = 4

1 + 1 = 2 2 + 3 = 5 0 + 4 = 4

PURPOSE: Addition practice.

You might want to try a shoelace chart for more addition practice. Directions are given in activity 5, page 38a.



name _____

2 + 7 = 9

4 + 3 = 7

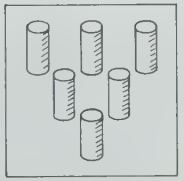
ADD

4 + 4 = 8	7 + 0 = 7	3 + 6 = 9
2 + 3 = 5	2 + 2 = 4	6 + 2 = 8
6 + 1 = 7	5 + 2 = 7	0 + 3 = 3

© 1974, SRA PURPOSE: Addition practice.

things 6 paper-towel or toilet-paper cores to serve as bowling pins, ball, cardboard

Make a pin setup chart on cardboard. Put the pins on the chart. A player rolls the ball. He writes a sentence for the number of pins knocked down plus the number of pins left up.



lesson Pages 75, 76

goal Addition practice with sums through 9

memo Counters are still in style. Make sure that you introduce the written word ADD—it's a direction on the page.

page 75 Have a child read the first addition sentence. *Is that true? How do you know?* (Count from the first set.)

Use the pictures to help complete the second sentence. Prove the answer by counting from the first set.

What's the rest of this page all about? Do your very best. Don't rush.

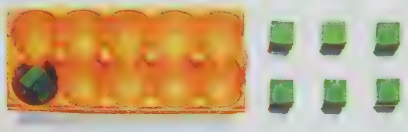
Be sure to lavish praise as they complete their work.

goal Solving addition word problems

page 76 This is the first time for WORD PROBLEMS. Talk about them. Point out that word problems have the same big question, **"How many in all?"** Independent readers are on their own. For the others, the reading will depend on you. Be sure to discuss **how** each problem was solved.

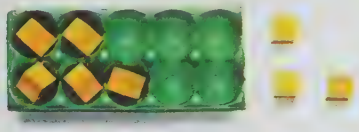
Make up some more word problems. Draw pictures as they did in the book. Use these problems with groups or individuals. The authors will feel very, very important.

name _____



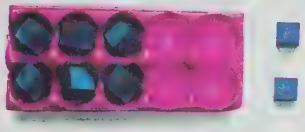
How many in all? 7

1 + 6 = 7



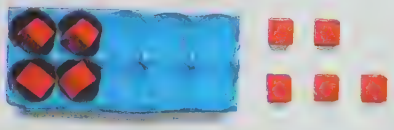
How many in all? 8

5 + 3 = 8



How many in all? 8

6 + 2 = 8



How many in all? 9

4 + 5 = 9

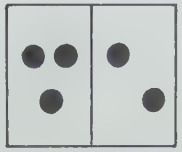
6 + 3 = 9 5 + 2 = 7 3 + 6 = 9

3 + 4 = 7 4 + 4 = 8 8 + 1 = 9

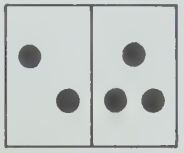
© 1974, SRA PURPOSE: Addition practice.

things dot cards (gummed dots on poster board) for sums through 9

Display in a horizontal position. Have children write the matching sentence (3 + 2 = 5). *Turn the card. Can you write another sentence?* (2 + 3 = 5)



3 + 2 = 5



2 + 3 = 5

lesson Page 77

goal Addition practice with sums of 7 through 9

things for each group:
ten-tray
9 counters
+, =, and numeral cards

warm-up Have a contest. Work in groups of three. Each group should have 1 ten-tray, 9 counters, and symbol and numeral cards (or pencil and paper).

The first person (A) puts a number of counters in the tray. The second person (B) puts in some more. The third person (C) records the action. The first two decide if the sentence is correct. Every correct sentence is worth 1 point.

Rotate for turns. Now B starts by putting a number in the tray; C puts in some more; A records the action. Maybe everyone can get 5 points. Wouldn't that be wonderful?

page 77 They should be ready. Go to it.

Those who have trouble with the bottom of the page use counters. Ask the children which was the hardest problem and why. Write it on the board and go back to it throughout the day.

lesson Page 78

goal Addition practice with sums of 5 through 7

things for each pupil: numeral cards

warm-up The silent game. Use an overhead or the chalkboard. Write the following:

How many? ___

___ + ___ = ___

Tell the pupils that you will show 2 sets with your fingers, and they will use their numeral cards to show you how many in all. Then you will stand by the child who is to fill in all the missing numerals. Erase the numerals each time so that play can go on. The goal is to work for 5 minutes with no one talking—not even the teacher! When directions are clear, start play.

page 78 Ask pupils to tell you the directions for the page. When directions are clear, it's independent work.

Which was the hardest problem? Why? Add it to the hard-problem list on the board and refer to it throughout the day.

78

Fill in the blanks.

How many in all? 6

3 + 3 = 6

How many in all? 6

5 + 1 = 6

How many in all? 7

4 + 3 = 7

How many in all? 6

2 + 4 = 6

1 + 4 = 5 5 + 2 = 7 6 + 1 = 7

2 + 3 = 5 3 + 2 = 5 3 + 4 = 7

PURPOSE: Addition practice.

Charlie's story is such a good activity, but there is not space for it here. See activity 1, page 128a.

name _____

2 + 2 = 4 1 + 3 = 4 4 + 2 = 6 3 + 3 = 6	6 + 2 = 8 3 + 4 = 7 6 + 0 = 6 1 + 5 = 6
2 + 5 = 7 6 + 1 = 7 5 + 3 = 8 2 + 4 = 6	4 + 4 = 8 7 + 2 = 9 1 + 8 = 9 2 + 6 = 8

© 1974, SRA PURPOSE: Progress check—addition.

See activity 2, page 128a.

See activity 3, page 128b.

lesson Page 79

goal **Progress check**—addition with sums through 9

memo The problems are grouped by levels of difficulty.

easiest	**average difficulty**
average difficulty	**hardest**

The same color is used to indicate boxes of the same level of difficulty.

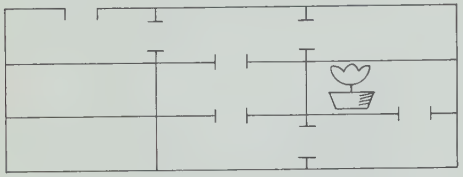
page 79 Children who are really struggling should not be challenged with the last box until they have had more practice. Assign three of the four boxes to meet individual needs. Remind children that this is a chance to show how much they've learned. Please **do not** mention testing. When directions are understood, let them work independently.

Encourage pupils to work without counters (unless necessary). Identify those who can work independently, those who are successful with the aid of counters, and those who are in trouble even with the help of counters. The first group is on easy street, the second groups needs practice, and the third group needs **you,** along with lots of work with manipulatives.

lesson Page 80

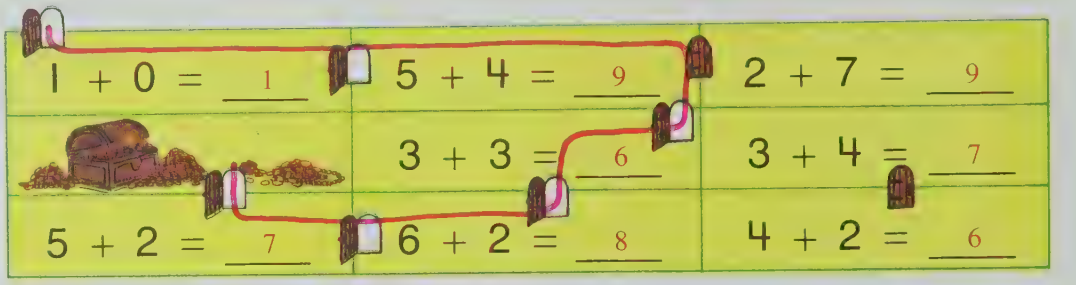
goal Addition practice with sums of 0 through 9

warm-up To acquaint pupils with a maze, draw a simple one (without addition problems) on the board and mark a path to the flowerpot.

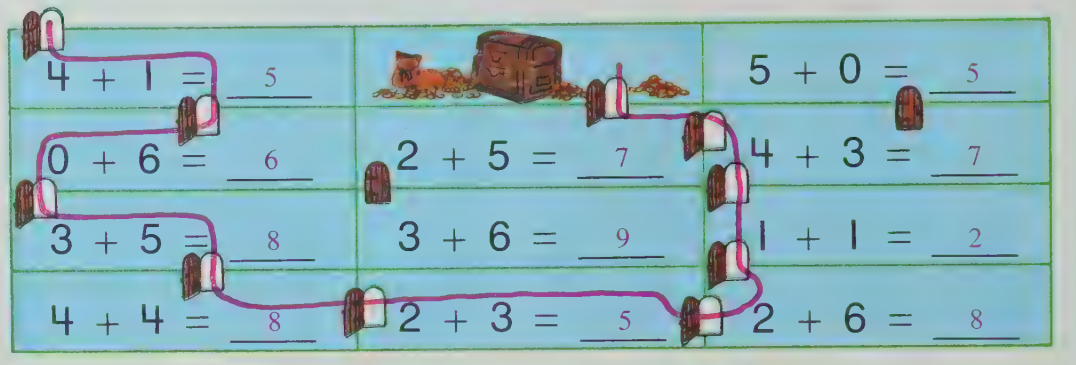


page 80 Work the first maze together. The heavy lines are walls. Doors are shown. Once through a door, it closes and locks automatically! If there is no other door out of the room, they may be trapped forever! Have them use a crayon to indicate the path to follow. Pupils then go back and do the addition **only** in the rooms marked along the path. Capable students may complete the second maze independently. Note that there are two possible paths through this maze.

Find your way to the treasure. Go through the open doors. Close each door behind you. Don't get lost.



Here's another treasure. Find your way.

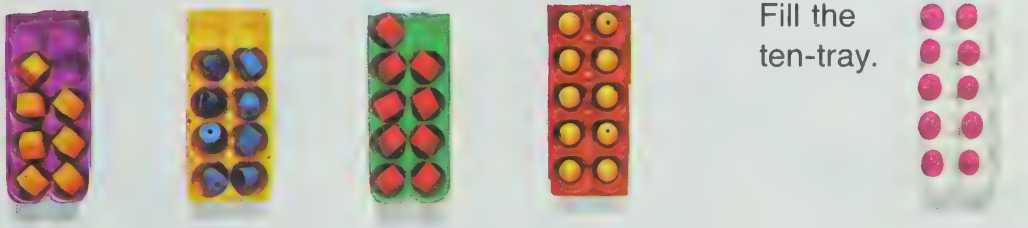


PURPOSE: Addition practice.

name _____

How many in each ten-tray?

1 2 3 4 5 6



7 8 9 10

Fill the ten-tray.

How many? 10

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PURPOSE: Using counting order to introduce ten.

lesson Page 81

goal Development of the concept of ten

things for each pupil:
ten-tray and counters
numeral card for 10

warm-up *Put a counter in your tray. How many? Put in one more counter. Now how many?* Review the one-more pattern through nine-and-one-more to introduce TEN.

Does anyone know how to write 10? Come to the board and show us.

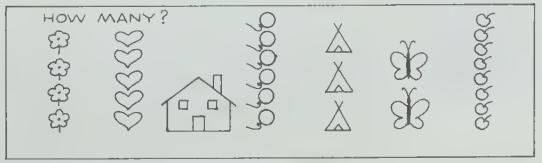
Distribute the numeral cards for 10. Make a big deal out of the size of the card. Discuss what makes ten a special number—two digits are needed to write it. That's why we have to have a larger card. Please discourage forming 10 with the numeral cards 1 and 0. That can cause confusion for some. One plus zero is **not** ten.

page 81 Discuss the page. Can the children tell you what they are to do? You may want to point out that the answer boxes are all the same size. Why? The size of the box can't tell the secret of the answer, so it's big enough for any of the numerals. Notice that they are to fill the last tray themselves before writing how many.

Let them work independently if possible. Watch for the child who may need further help with writing.

things numeral cards 1 through 10

A bulletin-board idea: Show sets of from 1 through 10 objects. Put the numeral cards in a container. Job: Pick a numeral card and match it with an appropriate set. Pin the numeral below the set.



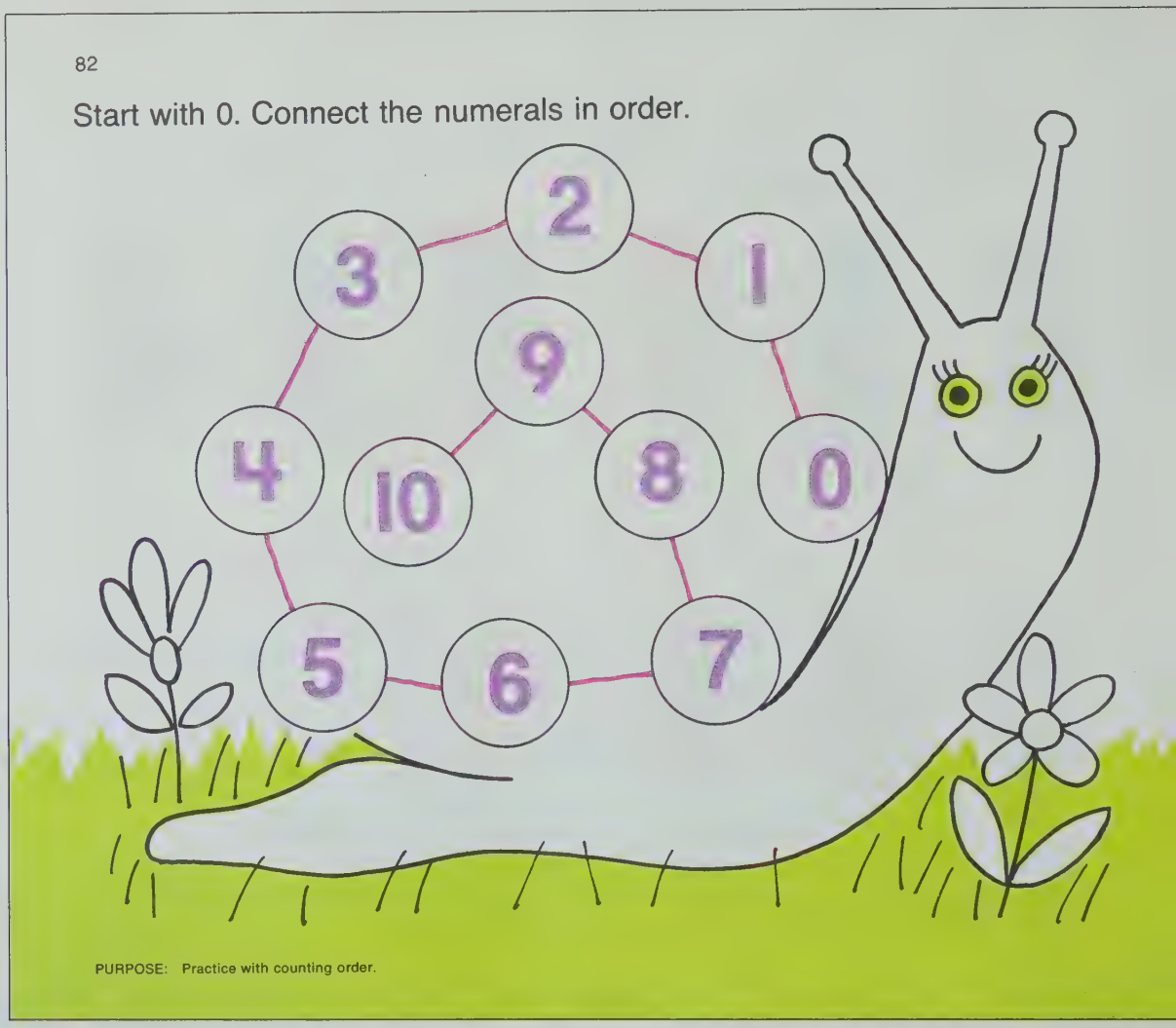
lesson Pages 82, 83

goal Practice with ordering numbers

things large numeral cards, 0 through 10

warm-up Scramble the set of cards and then pass them out to 11 youngsters. Project: Form an ordered line in front of the chalkboard. No help, teacher! They're on their own. If interest is high, repeat with different children. Can the second group do it faster?

page 82 Discuss directions. Children work independently.

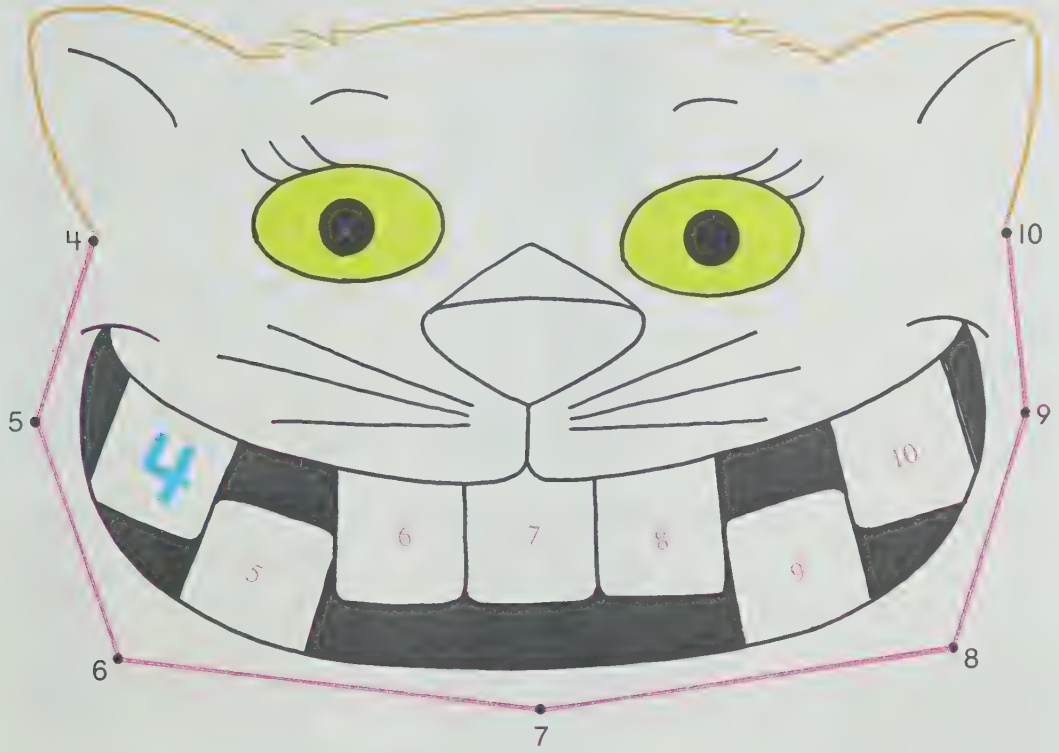


things number balls, paste, construction paper

Have the children cut out the balls, arrange them in order, and paste them on the construction paper.

name _____

Complete the picture. Then write the numerals in order.



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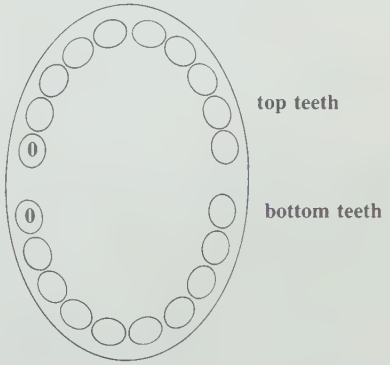
PURPOSE: Ordering numbers through ten.

goal Practice in writing numerals in order

warm-up Divide the class into 4 teams in front of the chalkboard. Begin with 0. A child from each team writes the next numeral in order until they get to 10. Keep the relay going. Begin with 4, then with 2, and so on. If the speed element is frustrating, please stop the activity.

page 83 Connect the dots first. The children are ready for this after the preceding page. Search for the least number and then begin. They should be delighted to write the numerals in order on the cat's teeth. A numeral written in reverse is obviously a cavity that requires a visit to the friendly dentist for lots of writing practice.



0
1
2
3
4
5
6
7

Make a spirit master like this. For each group of four pupils, cut at least two copies into strips. Place the strips facedown. Each person draws one strip, writes the next number in order, and passes the strip to the person on his right. When a person writes a 10 (in order), he keeps that strip and draws another from the pile. Continue until the last strip is complete. Whoever has the most strips wins.

lesson Pages 84, 85

goal Finding sums of 10

memo The commutative property is used on this page. It is up to you whether you explore the order of the two numbers.

things for each pupil:
ten-tray
counters—2 colors

warm-up Write the following on the board:

How many? ____
Add ____
How many now? ____

Put 6 counters of the same color in your tray. How many? Have a child record. *Add 4 counters. Use the other color.* Write 4 as you say it. *Count from 6. How many now?* Have a child record.

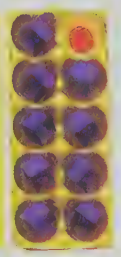
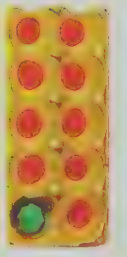
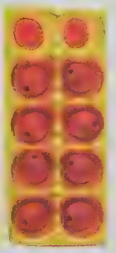
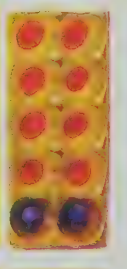
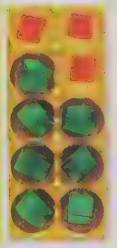
Repeat for other combinations that have a sum of 10 until the children feel at ease.

page 84 Do the first problem together. Stress these steps.

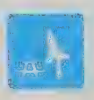
1. Count the colored dots and record how many.
2. Add the next number of dots to the tray.
3. Record how many now.

Children complete this page on their own. Go on to the next page if possible. They will have explored all the combinations that add to 10.

Fill in the blanks.

How many? 9 Add 1 How many now? 10	
How many? 1 Add 9 How many now? 10	
How many? 8 Add 2 How many now? 10	
How many? 2 Add 8 How many now? 10	
How many? 7 Add 3 How many now? 10	
How many? 3 Add 7 How many now? 10	

PURPOSE: Finding sums of ten.



things for each pupil: 10 beads (or other objects) strung on wire

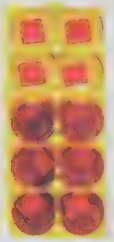
How many in all? Does anyone have more? less? Push the beads to show 2 sets. Put your hand on the wire between the 2 sets. Pretend that your hand is the plus sign. What can you write for the sets that you are showing? (4 beads, then a hand, then 6 more beads show 4 + 6 = 10.)

Turn your hand, but don't move it on the wire. What do your sets show now? (6 + 4 = 10) Explore with different sets. Save these wires. You'll use them again.

name _____

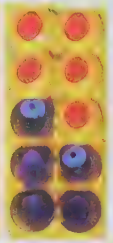
Fill in the blanks.

How many? 6
Add 4
How many now? 10

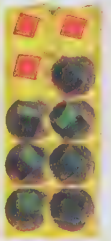


How many? 4
Add 6
How many now? 10

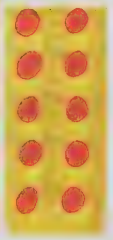
How many? 5
Add 5
How many now? 10



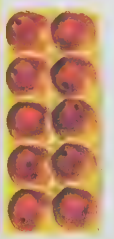
How many? 7
Add 3
How many now? 10



How many? 0
Add 10
How many now? 10



How many? 10
Add 0
How many now? 10



© 1974, SRA PURPOSE: Finding sums of ten.

Make a chart of all the ways to add to find 10. Let this be the children's work. Arrange the results as shown here. Ask if they see anything special.

10	
9 + 1	1 + 9
8 + 2	2 + 8
7 + 3	3 + 7
6 + 4	4 + 6
5 + 5	5 + 5
0 + 10	10 + 0

goal Finding sums of 10

memo In case you haven't guessed, this lineup of questions is to provide readiness for the vertical (computational) form of addition. It will be used from time to time. But the vertical form is a long way away. It is not introduced until page 118.

page 85 Let page 84 be your guide. Provide additional experiences with a tray and counters if there were any problems. Capable pupils may proceed independently.

lesson Page 86

goal Finding sets of ten

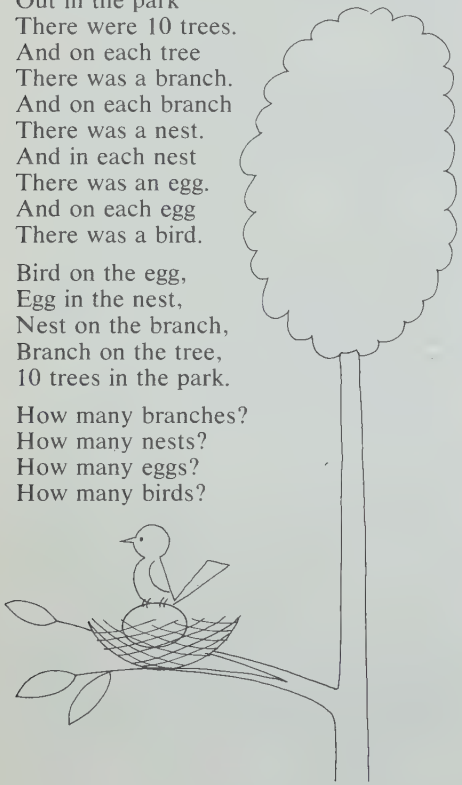
page 86 Discuss directions. Decide how to mark the page. Children work independently.

After the page is finished, the class might enjoy drawing a picture for this story.

Out in the park
There were 10 trees.
And on each tree
There was a branch.
And on each branch
There was a nest.
And in each nest
There was an egg.
And on each egg
There was a bird.

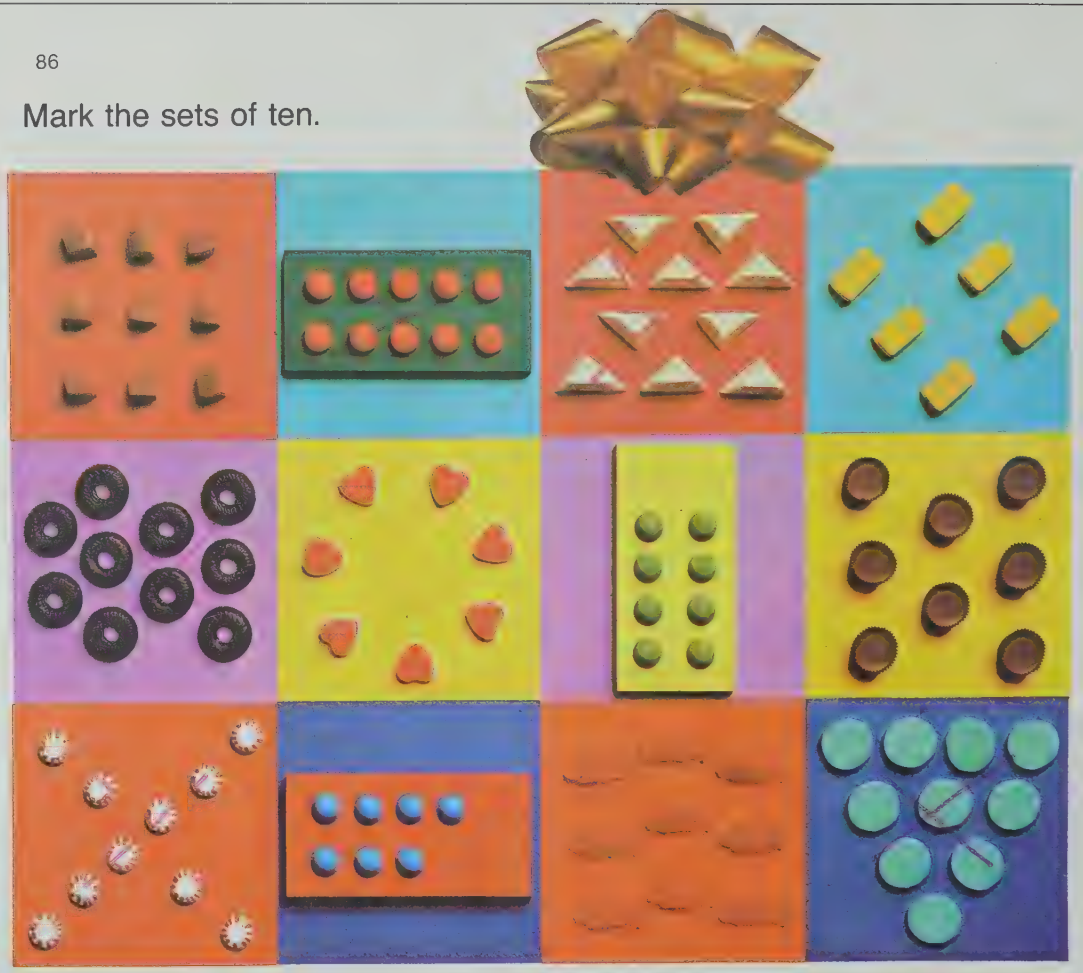
Bird on the egg,
Egg in the nest,
Nest on the branch,
Branch on the tree,
10 trees in the park.

How many branches?
How many nests?
How many eggs?
How many birds?



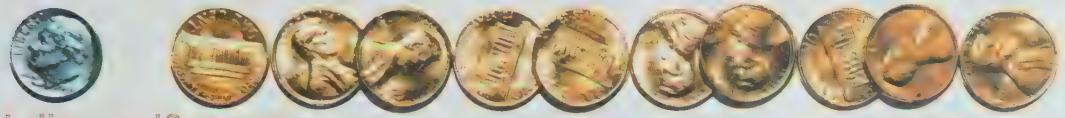
86

Mark the sets of ten.



PURPOSE: Finding sets of ten.

name _____



1 dime = 10 pennies

How many more pennies to equal one dime?

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See activity 4, page 128b.

lesson Pages 87, 88

goal Making sets of ten

memo This page is not meant to be an introduction to money, but money does provide a practical approach to the concept of ten.

things 1 dime, 10 pennies
for each pupil: counters

warm-up Show the DIME. *Do you know what this is? What can you do with a dime? How many* PENNIES *do you get for one dime?* Show 10 pennies.

Draw 5 rings on the board to represent pennies. Ask a child to draw more so that there will be 10 in all. Others match the action with counters (their pretend money). Repeat, beginning with a different number of pennies, until the children understand.

page 87 Do the first problem together. Children draw in the missing coins. Capable children may complete the page on their own. Check by counting from the coins pictured.

The lesson can be extended by having the children build a sentence for each row.

goal Making sets of ten

page 88 Notice that the directions say to **make** sets of ten. Discuss this with the children. Look for sets of ten. Since there are none, challenge them to find a way to make some. Do not give any help.

Discuss the results. Have individual children describe their way of solving the problem. Did anyone draw more shapes to complete a set of ten? Did anyone combine shapes from two sets to make a set of ten? Both solutions should be praised.

name _____

How many in all?

7

10

7

Add

5 + 4 = 9

4 + 2 = 6

3 + 7 = 10

2 + 3 = 5

1 + 6 = 7

4 + 4 = 8

7 + 3 = 10

2 + 4 = 6

8 + 2 = 10

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PURPOSE: Addition practice.

things flannel board, felt pieces
for each pupil: +, =, and numeral cards

Show 2 sets on the flannel board. Children show the sentence with their cards. Reverse. Show a sentence. Have a child show the 2 sets on the flannel board.

lesson Pages 89, 90

goal Addition practice with sums through 10

memo Take time to review the addition facts. There is nothing wrong with using fingers to help find answers. But **please** try to get to the point at which fingers are used only to count **from** the first number. (The children already know the first number. They don't have to count it, for goodness' sake!)

page 89 The directions should be familiar from previous pages – independent work. Encourage the use of counters if a child is unsure.

Which was the hardest problem? Why? Put it on the hard-problem list. Refer to the list whenever there is a minute to spare. Can you take any hard problems off the list?

goal Addition practice with sums through 10

memo Continue the use of counters (that includes fingers) until the child feels confident. A feeling of success is extremely important. Determine the cause for any mistakes. There must have been a learning step that was missed or not fully understood. Oral practice is as helpful as written practice.

warm-up A good time for a quick oral drill to review addition facts with sums of 0 through 10.

page 90 Everybody does the problems in one blue column and in the green column. If more practice is needed, all may do the problems in the other blue column.

90

ADD ADD ADD

4 + 5 = 9	6 + 0 = 6	3 + 4 = 7
3 + 6 = 9	4 + 4 = 8	6 + 2 = 8
6 + 3 = 9	2 + 5 = 7	2 + 7 = 9
6 + 1 = 7	4 + 2 = 6	3 + 3 = 6
1 + 6 = 7	10 + 0 = 10	0 + 9 = 9
7 + 1 = 8	8 + 1 = 9	2 + 6 = 8
0 + 6 = 6	4 + 3 = 7	7 + 3 = 10

PURPOSE: Addition practice.

things 2 cubes, counters

Mark the sides of each cube with the numerals 0 through 5 to make 2 dice. A child rolls the dice, and then adds the 2 numbers that land faceup. If he is correct, he takes 1 counter before passing the dice to the next player.

Set a time limit for play. The one with the most counters wins.

name _____

ADD

Color each box with 10 green.

5 + 5 = 10	4 + 4 = 8	1 + 9 = 10
6 + 3 = 9	8 + 2 = 10	5 + 4 = 9
7 + 3 = 10	5 + 3 = 8	9 + 1 = 10
2 + 7 = 9	2 + 4 = 6	2 + 6 = 8
5 + 2 = 7	8 + 0 = 8	3 + 4 = 7
4 + 6 = 10	4 + 5 = 9	3 + 7 = 10
7 + 2 = 9	2 + 8 = 10	1 + 8 = 9
10 + 0 = 10	3 + 3 = 6	6 + 4 = 10

© 1974, SRA PURPOSE: Addition practice.

STOP

Write a sentence on the board: 4 + 3 = ____ *How many in the first set?* (Four) *With your fingers, show how many in the second set. Begin with 4 and count the fingers you have showing—5, 6, 7. How many in all? Complete the sentence.*

lesson Page 91

goal Addition practice with sums through 10

things for each pupil:
10 counters
+, =, and numeral cards

warm-up Have a child select a number from zero through ten. Have the children show that number with counters.

Separate your counters into 2 sets. Now use your cards to make a sentence below your sets. What sentence did you make? List the sentences on the board.

page 91 This is the time to practice. We're getting ready to let the youngsters show off how much they know. Some will need a break between columns. When the sentences are completed and checked, have them color the boxes with sums of 10 in green. You may want to go on with this coloring. Color the boxes with sums of 9 in red; boxes with sums of 8 in blue, and so forth.

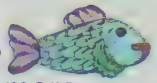
lesson Pages 92, 93

goal Practice with word problems

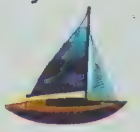
page 92 Don't let reading get in the way of having fun with word problems. Give all the help that's necessary. Suggest the children draw something for each story that does not name an item. Encourage originality. After they finish their stories, have a sharing time. They'll have some good ideas!

92

Finish each story.

You had 5 
You got 3 more.
How many in all? 8

You had 6
You got 4 more.
How many in all? 10

I had 5 
I got 5 more.
How many in all? 10

I had 7
I got 3 more.
How many in all? 10

I had 4.
You had 3.
How many in all? 7

She had 4.
He had 5.
How many in all? 9

We had 7.
We got 2 more.
How many in all? 9

She had 9.
I had 0.
How many in all? 9

PURPOSE: Addition practice.

name _____

7 + 3 = 10	1 + 9 = 10	
10 + 0 = 10	7 + 2 = 9	
9 + 1 = 10	3 + 5 = 8	0 + 10 = 10
5 + 5 = 10	4 + 6 = 10	0 + 9 = 9
5 + 4 = 9	3 + 6 = 9	6 + 4 = 10
3 + 7 = 10	8 + 2 = 10	2 + 8 = 10

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PURPOSE: Progress check—addition.

See activity 5, page 128b.

Your authors should be ready to write some more picture stories. Maybe this time you will want them to put each story on an index card. They can start their own story resource box.

goal **Progress check**—addition with sums through 10

page 93 Don't frighten the children with the word test. Counters are permitted. There is no time limit. The focus is on knowing **how** to find the answer. Children who make more than one error should practice some more. Do not let a child move on until he can find these sums—with or without counters. Reward hard work with a special game, story, or treat.

lesson Pages 94, 95

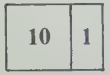
goal Development of the concept of eleven

memo Prepare numeral cards for 11 through 18 but do not distribute them until directed.

things for each pupil:
numeral cards for 10 and 1 only
ten-tray and counters

warm-up *Show 9 counters in your tray. Put in one more. How many now? Which card tells how many? Is there a place for one more counter in the tray?* No! Children may suggest putting the counter on top of another, but argue that the tray is full. The extra one must stay outside the tray.

You have a full tray and one more counter. How many? (ELEVEN) *Can you show the numeral 11 with only a 10-card and a 1-card?*

The 10-card is twice as wide as the 1-card. Let them struggle with this. Watch out for 

and

. Discuss whether any of these is the numeral 11. Someone will finally suggest putting the 1-card over the 0. Eleven really is 10 and 1! Distribute the numeral cards for 11.

page 94 The first problem reviews eleven. When directions are clear, children work independently. Discuss the results.

94

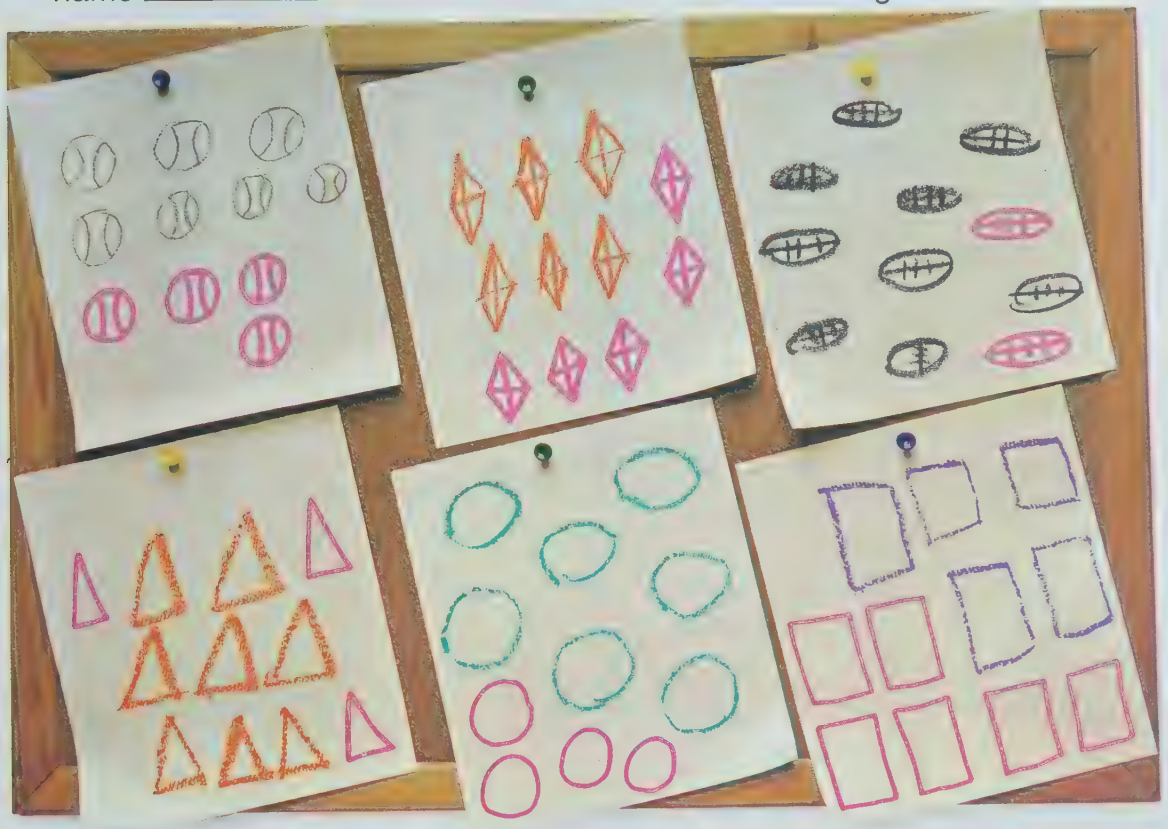
One more than 10 is 11.

Mark the sets of 11.

PURPOSE: Finding sets of eleven.

See activity 6, page 128b.

name _____ Draw enough to make 11.



© 1974, SRA PURPOSE: Making sets of eleven.

goal Making sets of eleven

memo This page starts an intensive study of the numbers 11 through 18. Plan the use of pages 95 through 124 according to your group's abilities. Working for mastery can backfire unless one is sensitive to the needs of each individual child. Please encourage the use of manipulatives. Let children search for patterns in the number facts. There is little reason to name the commutative property, but it would be joyous if some would discover this pattern.

page 95 A quick review of directions should be enough. This is independent work. Discuss the results.

How many did you make in the first box? Let's write a sentence to show what you did. Write it on the board and continue questioning. *Can you think of any more* COMBINATIONS *that add to 11?*

lesson Pages 96, 97

goal Finding sums of 11

things for each pupil:
ten-tray
counters – 2 colors

warm-up Children work in pairs (or each will need 2 trays and 11 counters). The rule of the game: The first ten-tray must be completely full before another can be used.

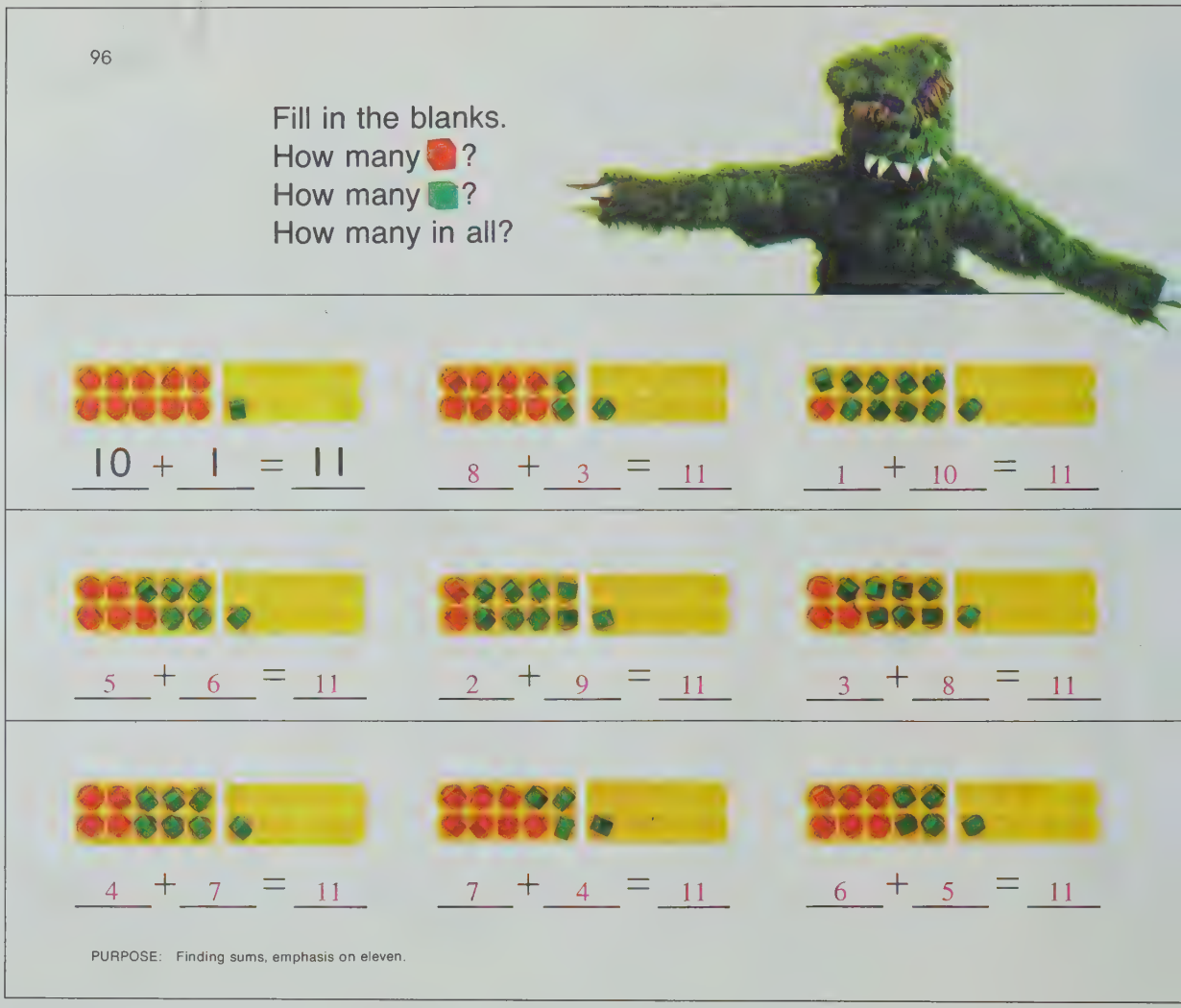
Show 5. Use one color of counter. Write 5 on the board as you say it. *Show 6 more.* Write + 6. *Be sure to fill one tray before you start another. How many in all?* Complete the sentence on the board. *Let's read the sentence together.*

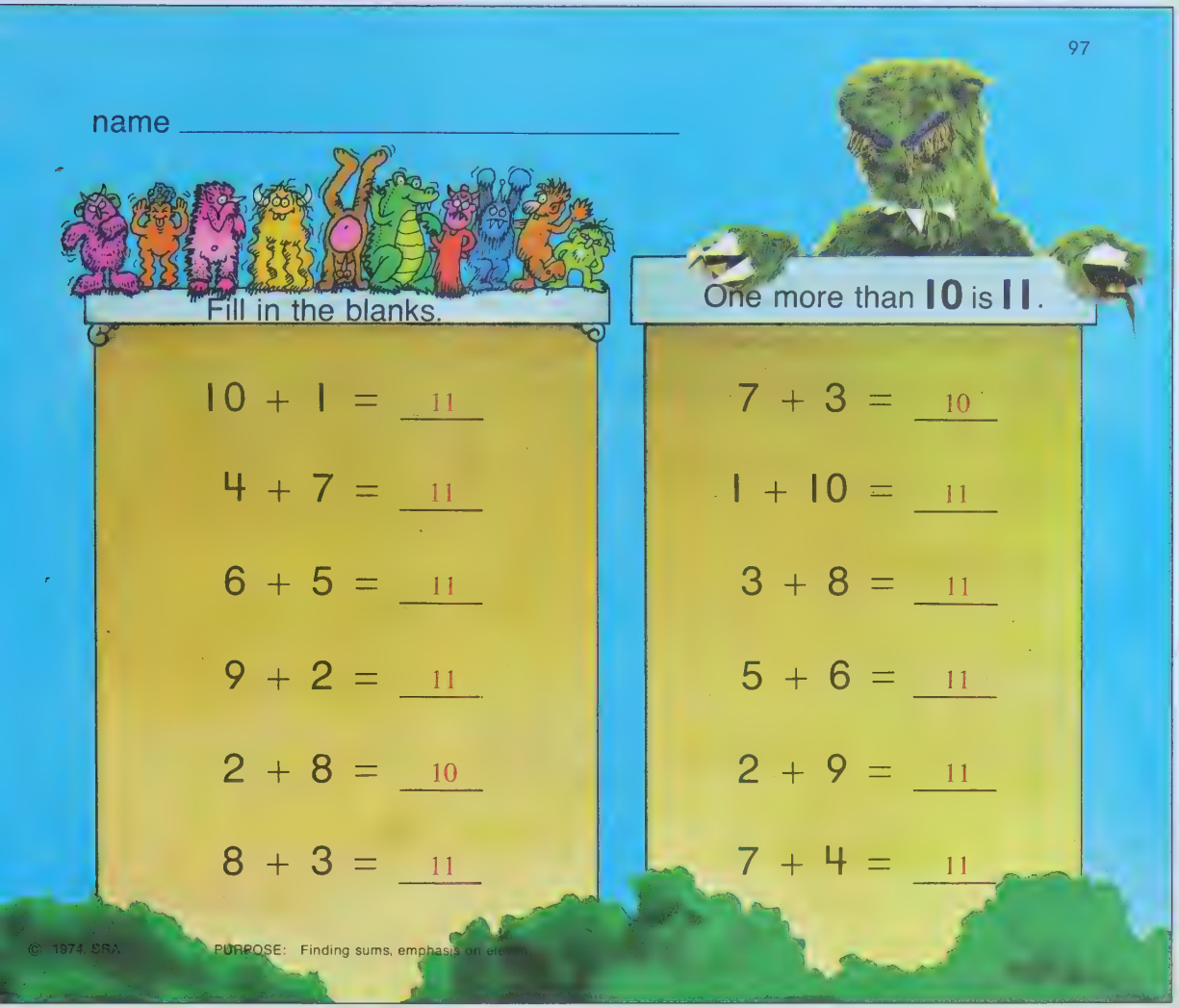
Continue the activity with other combinations that add to 11.

page 96 When directions are clear, children work independently. Discuss results. Any patterns?

Make a chart of addition combinations with a sum of 11. Discuss the chart. Can the children discover anything special?

11	
10 + 1	1 + 10
9 + 2	2 + 9
8 + 3	3 + 8
7 + 4	4 + 7
6 + 5	5 + 6


96
Fill in the blanks.
How many ?
How many ?
How many in all?
10 + 1 = 11
8 + 3 = 11
1 + 10 = 11
5 + 6 = 11
2 + 9 = 11
3 + 8 = 11
4 + 7 = 11
7 + 4 = 11
6 + 5 = 11
PURPOSE: Finding sums, emphasis on eleven.


97
name
Fill in the blanks.
10 + 1 = 11
4 + 7 = 11
6 + 5 = 11
9 + 2 = 11
2 + 8 = 10
8 + 3 = 11
One more than 10 is 11.
7 + 3 = 10
1 + 10 = 11
3 + 8 = 11
5 + 6 = 11
2 + 9 = 11
7 + 4 = 11
© 1974 SRA
PURPOSE: Finding sums, emphasis on

goal Addition practice, sums of 10 and 11

warm-up Review the facts for 11 by counting from a number to eleven. Write 5 on the chalkboard. Beside it draw a set of 6 objects. *Begin with 5. Now count the objects—6, 7, . . . , 11. How many in all?* Write the equation.

Repeat, using other combinations for 11.

page 97 Warn the children that there are a couple of foolers on the page. They will have to watch very carefully for them. Continue the use of counters with those who need this extra help. Discuss results. Was anyone fooled?

things box, index cards

Put a large 11 on one side of a box. Write the addition facts for 11 on index cards. Use two 1-digit numerals only.

Do not write the answers on the back. Store the cards in the box and use them for more practice.

5 + 6	7 + 4

lesson Pages 98, 99

goal Development of the concept of twelve

things for each pupil:
numeral cards for 10 and 2 only
2 ten-trays
counters

warm-up *Show 10 counters in your tray. Add one more. You'll have to use your other tray. How many? Add one more. Now how many?* (TWELVE) *Can you show the numeral 12, using only a 10-card and a 2-card?* (Cover the 0 with the 2.)

Distribute numeral cards for 12.

page 98 Review the top of the page together. Discuss directions. Children work independently. Share results.

How many more did you make in the first box? Let's show what happened by using numbers. How many to begin with? How many did you make? How many in all? (11 + 1 = 12)

Continue for the remaining boxes.

PURPOSE: Making sets of twelve.

things for each pupil: paper folded in half lengthwise

Have children write 12 at the top of one column, 11 at the top of the other. They are to list all the addition combinations they can think of for each number. Give them 6 + 6 and 6 + 5 to begin with. Some may include 10 + 2, 11 + 1, 10 + 1, 11 + 0, 12 + 0. Don't push for these.

name _____

Fill in the blanks.
How many ■?
How many ■?
How many in all?

6 + 6 = 12	7 + 5 = 12	5 + 7 = 12
3 + 9 = 12	4 + 8 = 12	9 + 3 = 12
10 + 2 = 12	8 + 4 = 12	2 + 10 = 12

© 1974, SRA PURPOSE: Finding sums, emphasis on twelve.

goal Addition practice with sums of 12

things for each pupil:
ten-tray
counters

warm-up Work in pairs. Each child in a pair should have a different color or different kind of counter. One will act as first set builder, the other as second set builder.

First set builder, show 1. Write 1 as you say it. *Second set builder, add 11 more. Remember to fill the first tray before using another one.* Write + 11 = ___. *How many in all?* Write 12.

Empty the trays. First set builder, show 11. Second set builder, add 1 more. Write this sentence also.

Continue to explore the other addition combinations for 12. Record the findings in a chart. See anything special?

12	
1 + 11	11 + 1
2 + 10	10 + 2
3 + 9	9 + 3
4 + 8	8 + 4
5 + 7	7 + 5
6 + 6	

page 99 Does the page look familiar? Review directions. Use real trays and counters if there's trouble. Discuss results.

things box, index cards

Label a box with a large 12 on one side. Write the addition facts for 12 on index cards. Omit the answers. Use the cards for more practice.

Variation: Mix together cards for 11 and 12. Children must sort them into the correct box.

7 + 5	8 + 4

lesson Page 100

goal Addition practice; sums of 11 and 12

things for each pupil: counters

warm-up Review counting from a number to 12. Write 7 on the chalkboard and then make 5 marks. *Count **from** 7 —8, 9, 10, 11, 12. 7 plus 5 is how many?*

Continue with additional examples.

page 100 Encourage pupils to use the picture if they need help in counting to find a sum. Some may prefer ten-trays and counters.

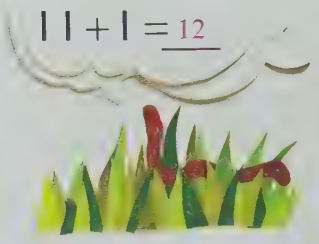
Discuss the results. Were there any foolers? Work with individuals to try to determine why there were mistakes. Use manipulatives and give practice in counting from a number if necessary.

100

One more than **11** is **12**.

Fill in the blanks.

5 + 7 = 12	7 + 5 = 12	3 + 9 = 12
9 + 3 = 12	2 + 10 = 12	8 + 4 = 12
4 + 8 = 12	8 + 3 = 11	11 + 1 = 12
2 + 9 = 11	6 + 6 = 12	



PURPOSE: Finding sums, emphasis on twelve.

name _____

One more than **12** is **13**.

13 boys in a witch's tree . . . **12** got caught and the other went free.

Use counters for these.

12 + 1 = 13	8 + 5 = 13
11 + 2 = 13	7 + 6 = 13
10 + 3 = 13	6 + 7 = 13
9 + 4 = 13	5 + 8 = 13
	4 + 9 = 13

© 1974, SRA PURPOSE: Introduction to thirteen.

things box, index cards

Time to make the 13-box. Continue to write only combinations with two 1-digit numbers—no answers, please. Use the cards for practice.

lesson Pages 101, 102

goal Development of the concept of thirteen

memo Only you can judge when to call a time-out to practice the facts introduced so far. Maintain a gamelike attitude. Avoid frustration. Try a contest that awards one point for sums of 1, two points for sums of 2, and so on.

things for each pupil: 13 counters

page 101 Have fun with the top of the page. *What do you know about* THIRTEEN? Accept answers from "It's twelve and one more" to "It's unlucky."

Put 13 counters on your desk. Push the counters into 2 sets. How many in the first set? in the second set?

Record the resulting sentences on the board. Challenge the children to find at least ten ways to separate 13 into 2 sets. Make a 13-chart as you did for 11 and 12.

Have pupils complete the page. Encourage the use of counters (or their fingers) to count from the first number. This will help build a feeling of success.

goal Finding sums of 12 and 13

things for each pupil:
numeral cards for 10 and 3 only

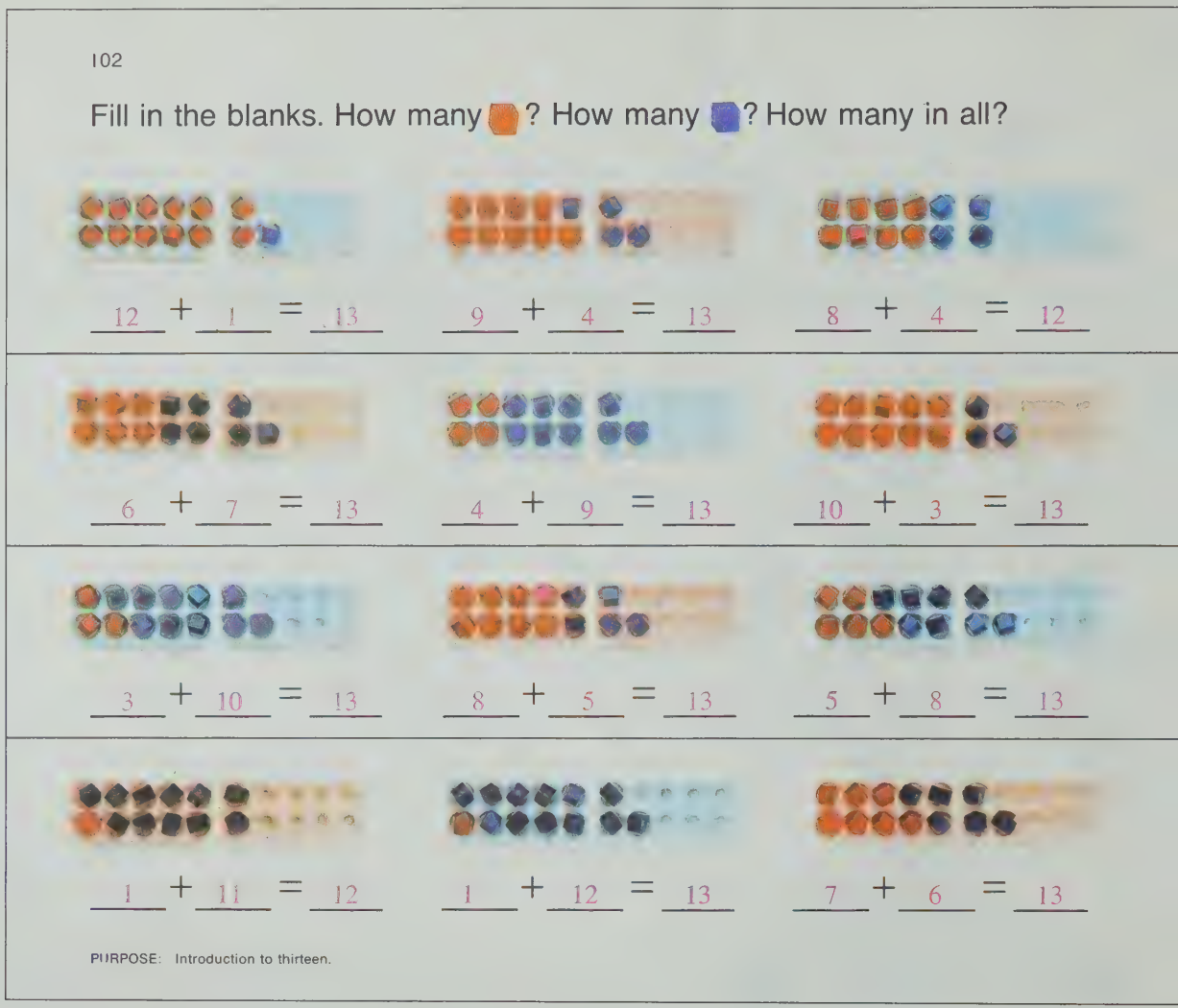
warm-up Use the 13-chart to review the combinations.

Can you show 13 with only a 10-card and a 3-card? Distribute the numeral cards for 13.

Practice counting from a number to 13. *Start **from** 8. Add 5 more. 9, 10, . . . , 13.* Continue with other combinations for 13.

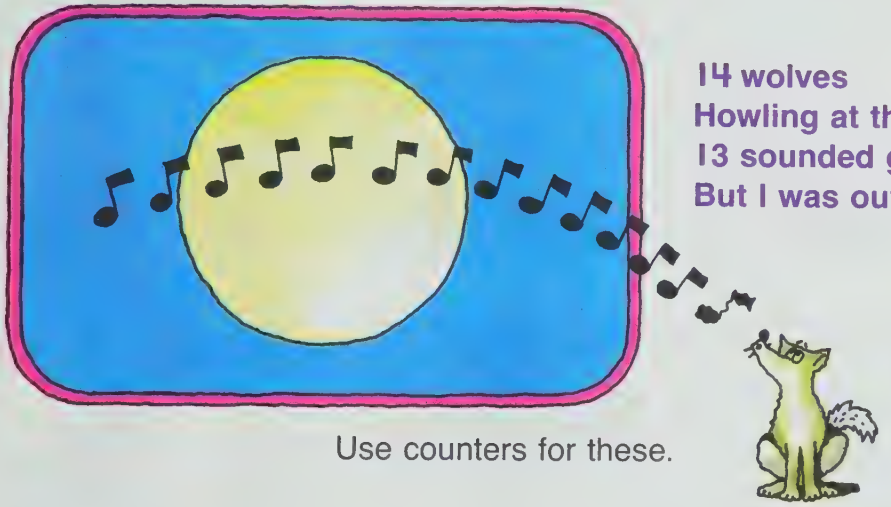
page 102 *Have you ever seen a page like this before? What do you do?*

Children work independently. Use real trays if needed. Have them read the addition sentences to check.


102
Fill in the blanks. How many ? How many ? How many in all?
12 + 1 = 13
9 + 4 = 13
8 + 4 = 12
6 + 7 = 13
4 + 9 = 13
10 + 3 = 13
3 + 10 = 13
8 + 5 = 13
5 + 8 = 13
1 + 11 = 12
1 + 12 = 13
7 + 6 = 13
PURPOSE: Introduction to thirteen.

name _____

One more than 13 is 14.



14 wolves
Howling at the moon.
13 sounded good,
But I was out of tune.

Use counters for these.

13 + 1 = 14	10 + 4 = 14	7 + 7 = 14
12 + 2 = 14	9 + 5 = 14	6 + 8 = 14
11 + 3 = 14	8 + 6 = 14	5 + 9 = 14

© 1974, SRA PURPOSE: Introduction to fourteen.

things counters

Work with less capable children using counters to show addition combinations for 11, 12, and 13. Have them tell you sentences for their sets. Record the sentences on the board.

things fact cards and boxes for 11, 12, 13

Mix the fact cards for 11, 12, and 13. More capable children can then sort these into the correct box.

lesson Pages 103, 104

goal Development of the concept of fourteen

things for each pupil:
numeral cards
14 counters

warm-up Everyone should have his set of numeral cards. *Show me the number that is 1 more than 6. Show me the number that is 1 more than 10. Show me the number that is 1 more than 12. Now show me 1 more than 13.* Tease just a bit. Someone will come up with the 10- and 4-cards to show FOURTEEN. Then pass out the numeral cards for 14.

Continue with the verbal game. *Show me 2 more than 10; 4 more than 10; 1 more than 10; 0 more than 10; 3 more than 10.*

page 103 This type of page is familiar. Continue to encourage everyone to count from the first number to find the answer. When everyone is finished, have children work with 14 counters to discover all the possible addition combinations. Record them to make a 14-chart.

goal Addition practice, sums of 13 and 14

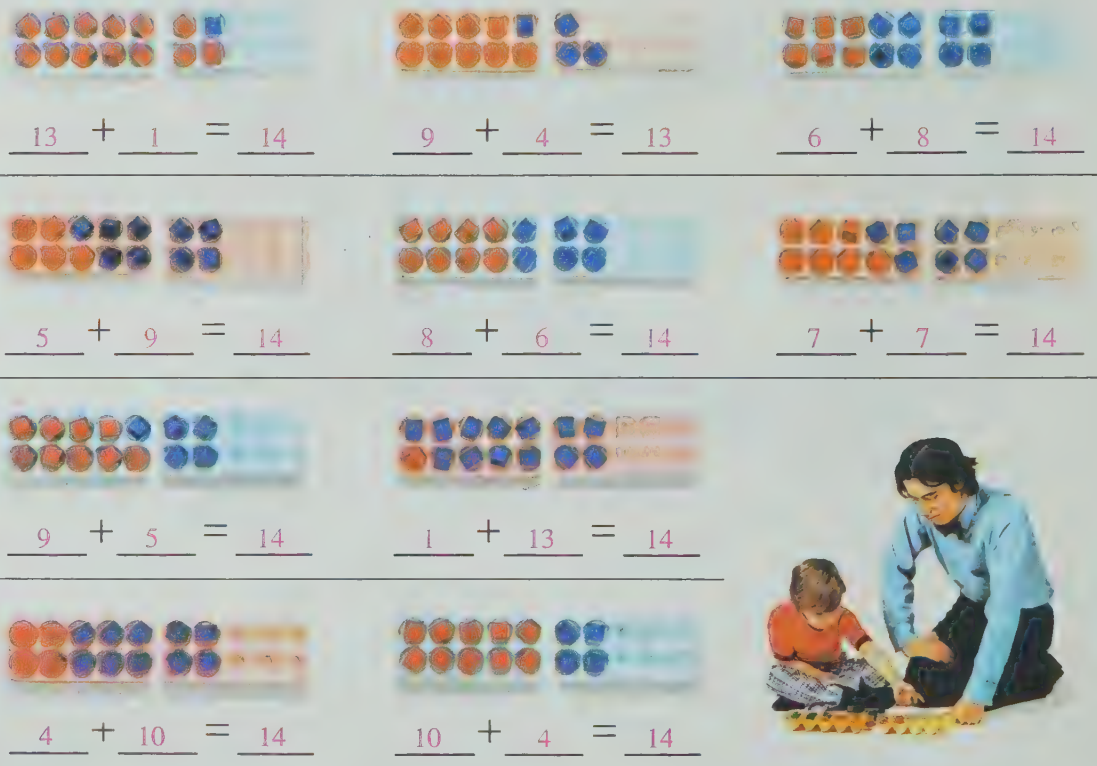
page 104 A familiar technique in a new setting.

Have you ever done a page almost like this? Do you remember what to do?

Review directions. Children work independently. Check by reading the completed addition sentences.

104

Fill in the blanks. How many ? How many ? How many in all?



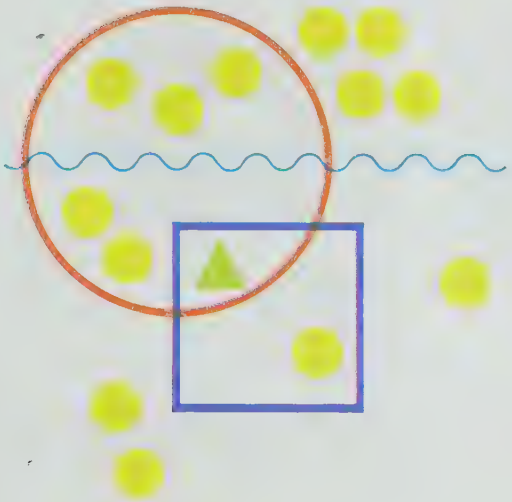
PURPOSE: Finding sums, emphasis on fourteen.

things box, index cards

If your class is making fact-card boxes, this is the time to make the box for 14. Remember—addition combinations with two 1-digit numbers only.

105

name _____



How many above the ~ ? 7

How many below the ~ ? 7

How many in all? 14

How many inside the ○ ? 6

How many outside the ○ ? 8

How many in all? 14

How many ● ? 13

How many ▲ ? 1

How many in all? 14

How many inside the □ ? 2

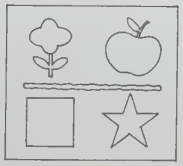
How many outside the □ ? 12

How many in all? 14

© 1974, SRA PURPOSE: Addition practice.

things flannel board and felt pieces, yarn

Show 2 objects above the yarn and 2 more below.



I'm thinking of one of these 4 things. Can anyone guess which one? You may ask only two questions that I can answer with a yes or no. Remember—no more than two questions! Tease until someone asks whether the thing is above (or below) the yarn. This is the key question. Let them discover it.

lesson Page 105

goal Practice with position vocabulary; addition practice

page 105 Something new! Have fun working the page together. Watch for pupils who have difficulty with the position words: ABOVE, BELOW, INSIDE, OUTSIDE. Pupils should find the sums independently.

lesson Pages 106, 107

goal Development of the concept of fifteen

things for each pupil:
numeral card for 15

page 106 *Look at the picture. How many people are wearing something red?* (8) *How many are not wearing anything red?* (7) *How many people in all?* (FIFTEEN) This introduction is enough to get started on the page.

Any independent readers? If not, the reading will depend on you. Let them do their own counting and recording. Praise them for all their hard work. Give a numeral card for 15 as an award.

106

One more than 14 is 15.
Can you find a set of 15?

How many boys? 7

How many girls? 8

How many in all? 15

How many have balloons? 1

How many don't? 14

How many in all? 15

How many have dogs? 9

How many don't? 6

How many in all? 15

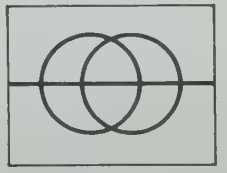
How many have hats? 10

How many don't? 5

How many in all? 15

PURPOSE: Introduction to fifteen.

Make a spirit master like this. Work in pairs. The first child will give oral directions to the second about what to draw and where to draw it. Put a check inside 1 circle and above the line. Put an **X** outside both circles and below the line, and so forth.



name _____

Fill in the blanks.
How many ■ ?
How many ■ ?
How many in all?

14 + 1 = 15

10 + 5 = 15

7 + 8 = 15

7 + 7 = 14

5 + 10 = 15

9 + 5 = 14

9 + 6 = 15

8 + 7 = 15

6 + 9 = 15

1 + 14 = 15

© 1974, SRA PURPOSE: Finding sums, emphasis on fifteen.

goal Addition practice sums of 14 and 15

things overhead projector and counters or flannel board and felt pieces

warm-up Begin with 15 counters on the overhead. Make sure everyone agrees that there are exactly 15. Make a line segment to show a separation into 2 sets. Place 1 counter on one side and 14 on the other. The children record the addition sentence on paper. (1 + 14 = 15)

Take one from the 14 and add it to the 1-side. The children record 2 + 13 = 15. Continue moving one at a time until all the combinations for 15 are complete. Make a 15-chart if you wish.

page 107 One more time. Stress counting only the dots of the second set separately by counting from the number of dots in the first set.

things box, index cards

Time for the 15-box. Reminder: addition combinations with two 1-digit numbers only. Pupils can work in the individual boxes for 11 through 15 for additional practice as well as sort mixed cards into the correct box.

STOP

Each child scatters 15 small **X**s on his paper. The children all close their eyes and make a large ring on the paper. *Are some of the* **X**s *inside the ring? Mark the* **X**s *that are outside the ring.* Repeat. This time they draw a line with their eyes closed and then mark the things that are above the line.

lesson Pages 108, 109

goal Development of the concept of sixteen

things for each pupil:
numeral card for 16

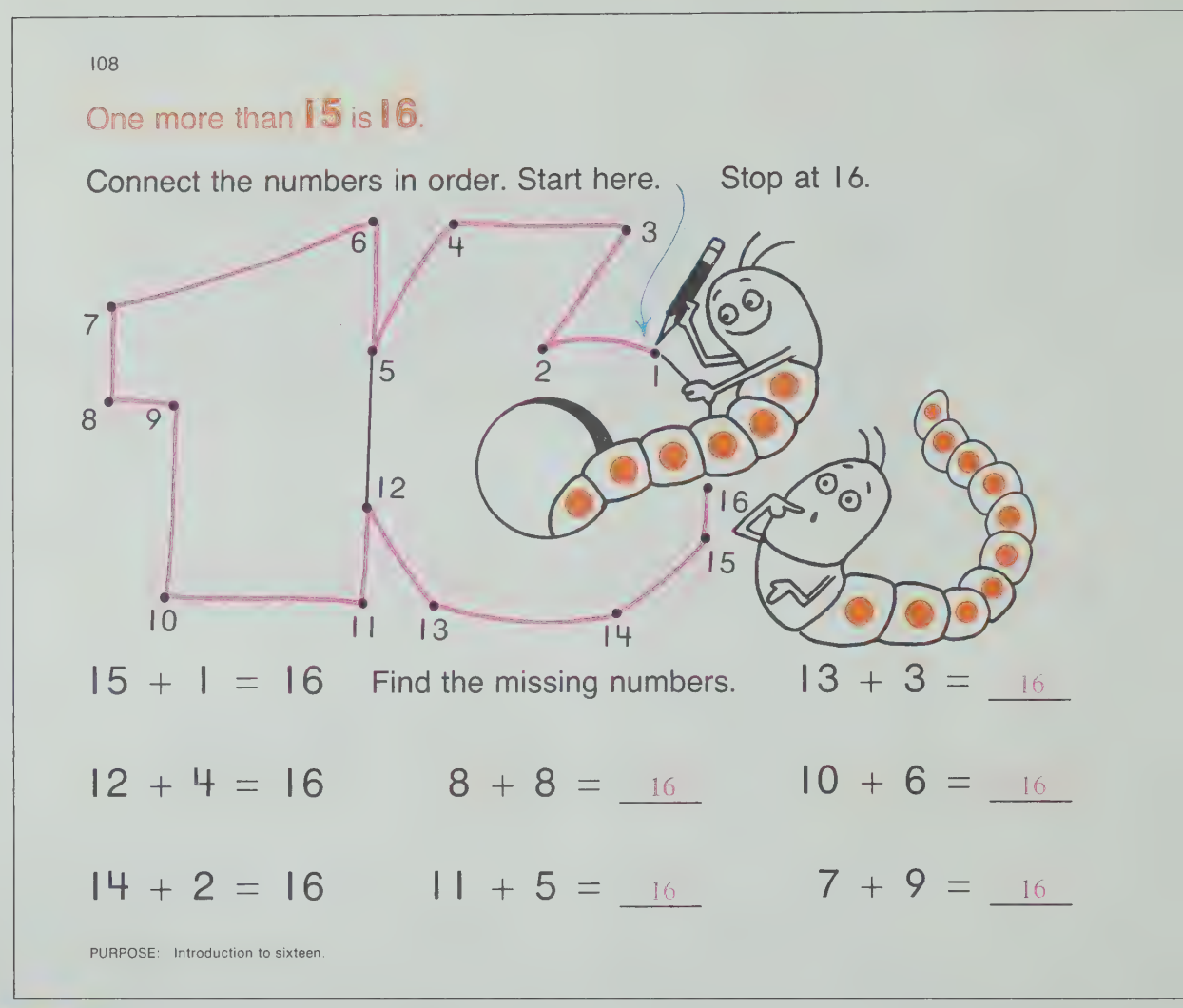
warm-up Practice counting to 15. And for a change of pace, count backward from 15 as well.

What number is 1 more than 15? (SIXTEEN) *Are you sure? How many think you know how to write the numeral?* Have them show you and award a numeral card for 16 as a prize (or as an aid to those who didn't make it).

page 108 Review directions for connecting numbers. *Surprise! What did you make?*

Enact the completed sentences in the first column. Have 15 children count off and stand as they say their number in order. Ask one more to stand. Then ask the question: *How many in all?*

Focus on counting from the first number as the pupils do the problems on the page. Check answers by reading the sentences aloud.

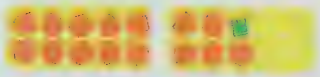


things box, index cards

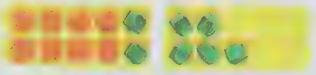
You're right! It's time for the 16-box. Pair pupils for additional practice whenever time permits.

name _____

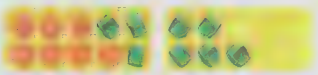
Fill in the blanks.



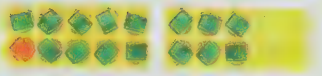
15 + 1 = 16



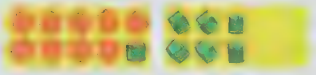
8 + 7 = 15



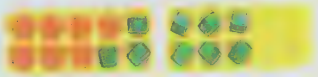
7 + 8 = 15



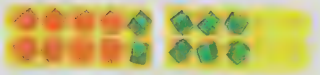
1 + 15 = 16



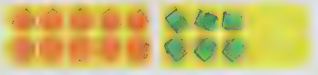
9 + 7 = 16



7 + 9 = 16



8 + 8 = 16



10 + 6 = 16

6 + 10 = 16

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PURPOSE: Finding sums, emphasis on sixteen.

goal Addition practice, sums of 15 and 16

page 109 No more need be said. Everyone knows what to do by now.

Children who need additional manipulative experiences should use ten-trays and counters under your direction as they do this page.

Check work by having the addition sentences read aloud. Look for patterns. Please don't name the commutative property—it's just nice to know how this property works in order to make learning easier.

things decks of playing cards

Remove all face cards. Group children (2 to 4 per group). Place deck facedown. First player draws 2 cards. If he can say the correct sentence (2 + 9 = 11), he keeps his cards. If he is wrong, they go to the bottom of the deck. Second player draws 2 cards. Play continues until cards are gone. The one with the most cards wins. (If children are going to count the shapes on the cards, they do **not** count the small shapes on the corners of the card—just the big shapes in the center.)

lesson Pages 110, 111

goal Development of the concept of seventeen

memo The present focus of the work on sums of 11 through 18 is on concept, notation, and the operation of addition. Some children may remember some of the number facts, but **please** do not emphasize mastery of the facts now. Rather, have fun with big numbers.

things for each pupil:
numeral card for 17

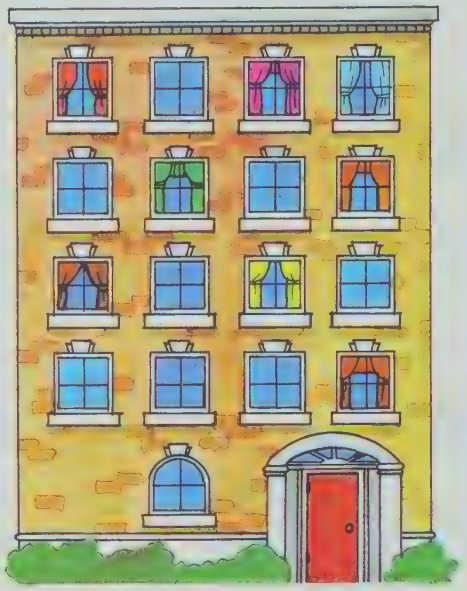
warm-up Line up 16 children. Ask one to turn his back to the class. *How many backs do you see? How many fronts? How many in all?* Record the number sentence 1 + 15 = 16 on the board. Direct one more child to turn around. Continue until only backs are seen.

Bring up one more child. *16 and 1 more. How many in all?* (SEVENTEEN) Have pupil 17 distribute the cards for 17.

page 110 Read the questions together. Children work independently.

110

One more than **16** is **17**.



Can you find a set of 17?

How many ? 1

How many ? 16

How many in all? 17

How many have ? 8

How many don't? 9

How many in all? 17

Find the missing numbers.

16 + 1 = 17 11 + 6 = 17 14 + 3 = 17

8 + 9 = 17 10 + 7 = 17 5 + 12 = 17

PURPOSE: Introduction to seventeen.

things box, index cards

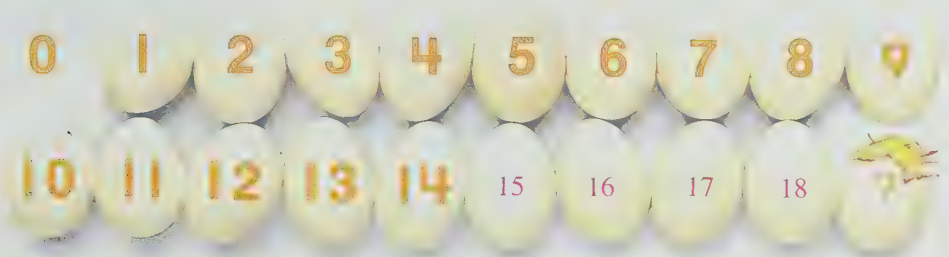
It's time for the 17-box.

Examine the number of cards in each box. Does anyone notice that as the sums become larger, the boxes have fewer cards? Share the amazement. Don't try to explain why.

8 + 9	9 + 8

name _____

Fill in the missing numbers.



Connect the numbers.
Start at 0. Stop at 18.

17 + 1 = 18

12 + 6 = 18

15 + 3 = 18

16 + 2 = 18

13 + 5 = 18

Find the missing numbers.

9 + 9 = 18

10 + 8 = 18

11 + 7 = 18

14 + 4 = 18

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PURPOSE: Introduction to eighteen.

goal Development of the concept of eighteen

things for each pupil:
large numeral cards, 0 through 17
numeral card for 18

warm-up Distribute large numeral cards for 0 through 17.

Who has the card for 1? Come here and stand. Does anyone have the card for the number that comes before 1? Stand in order. Who has the number that comes after 1? Continue through 17.

What number comes after 17? (EIGHTEEN) *Who has that number?* Hope to get someone who will suggest using the 10- and 8-cards. Let that person hand out the numeral cards for 18.

page 111 This is a very special day—we've completed the introduction of the addition facts!

Give help where needed. Everyone counts aloud from the first number to check the number sentences.

EVERYONE—
pupils and teachers alike—
DESERVES PRAISE
FOR THE HARD WORK DONE!

things box, index cards

You guessed it. Time to make the last box—the box for 18.

Make up sets of mixed cards—two or three from each box. The children then sort the cards into the correct box. When this is completed, have them match the cards in each box that have the same numbers (9 + 3 and 3 + 9).

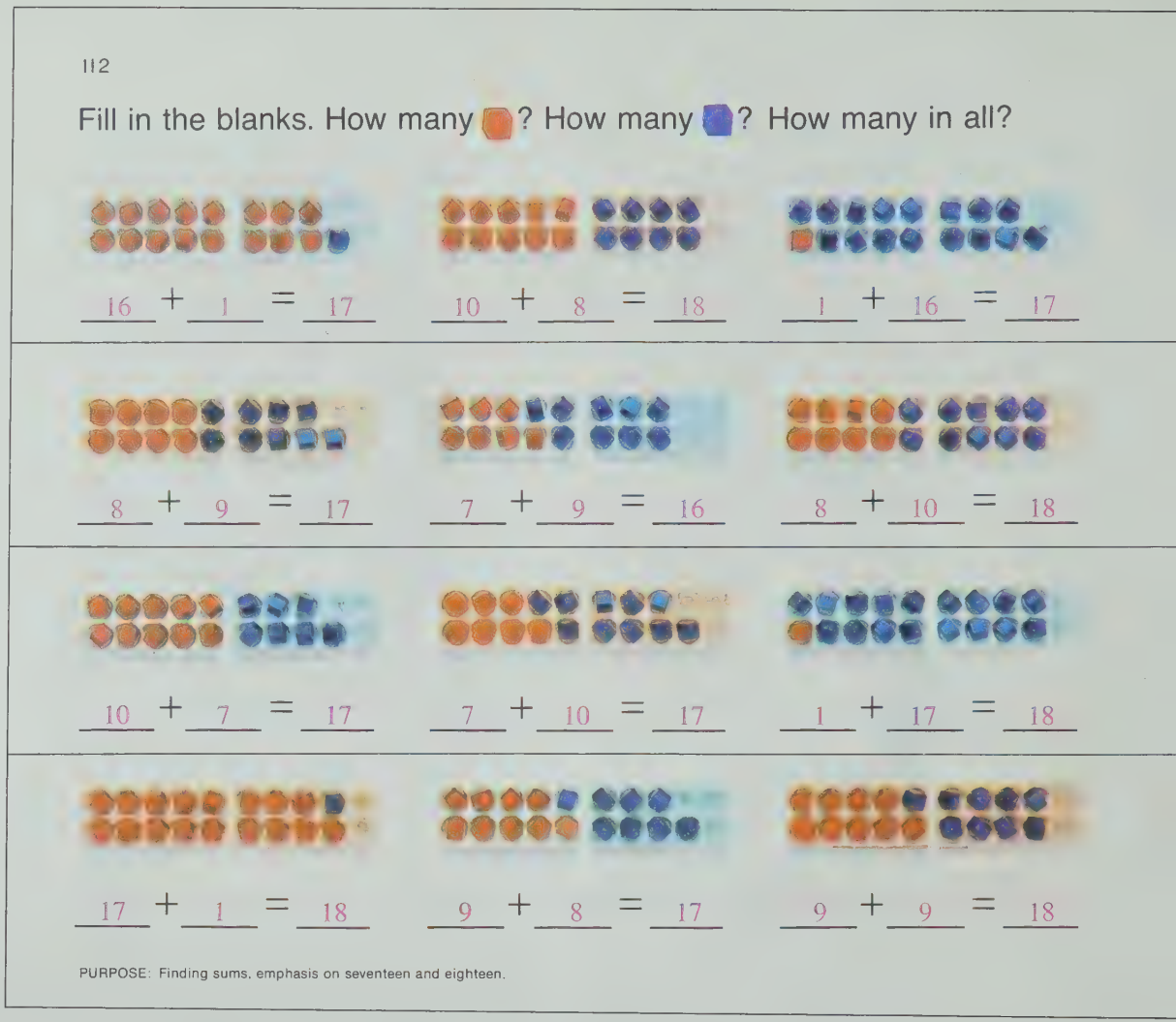
lesson Pages 112, 113

goal Addition practice, sums of 17 and 18

things for each pupil: 18 counters

warm-up *Take out 18 counters. Push your counters to show a set of ten. You have a set of ten and how many more? How many in the first set? How many in the second set? How many in all? Who can come up and write a number sentence for these sets?* Continue the activity with other combinations for 18.

page 112 Enough said—carry on.


112
Fill in the blanks. How many ? How many ? How many in all?
16 + 1 = 17
10 + 8 = 18
1 + 16 = 17
8 + 9 = 17
7 + 9 = 16
8 + 10 = 18
10 + 7 = 17
7 + 10 = 17
1 + 17 = 18
17 + 1 = 18
9 + 8 = 17
9 + 9 = 18
PURPOSE: Finding sums, emphasis on seventeen and eighteen.

name _____

Fill in the blanks.

One more than 10 is 11 .

One more than 11 is 12 .

One more than 12 is 13 .

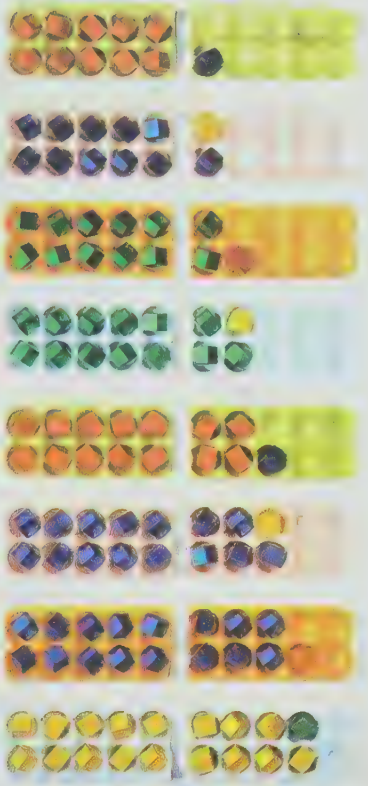
One more than 13 is 14 .

One more than 14 is 15 .

One more than 15 is 16 .

One more than 16 is 17 .

One more than 17 is 18 .



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PURPOSE: Recognizing numbers through eighteen.

goal Review of the numbers 10 through 18

things 2 ten-trays
counters

warm-up Here is the first place that you can evaluate how great the pupils' desire is to recount known numbers. Fill 1 ten-tray. Get agreement that (1) it is full, and (2) it has 10 counters in it.

Set down the full tray. Pick up another tray. Put in 3 counters. Ask how many. Pick up the full ten-tray also and ask how many in all. The odds are that many children will want to recount the 10 as well as the number in the second tray. If so, start again. Get agreement that the tray is full and there are 10 in it. Put down the tray. Put 6 counters in the second tray. Ask how many, Pick up the full ten-tray. Ask how many in all. You are lucky if they count only from the number of the full tray. If they want to recount the 10 also, you will know how much more practice will be needed in counting from a number.

page 113 *The girl has 1 full tray. That's how many? And how many more are in the other tray? How many blocks has the girl put in the trays?*
Discuss directions for the rest of the page. Children work independently. You may wish to check by reading the completed sentences together.

things flannel board, felt squares—2 colors, graph paper

Show the one-more pattern with felt squares on the flannel board. Use the same second color each time you show one more.

Have the children duplicate the pattern by coloring in blocks on graph paper. Go through 18.

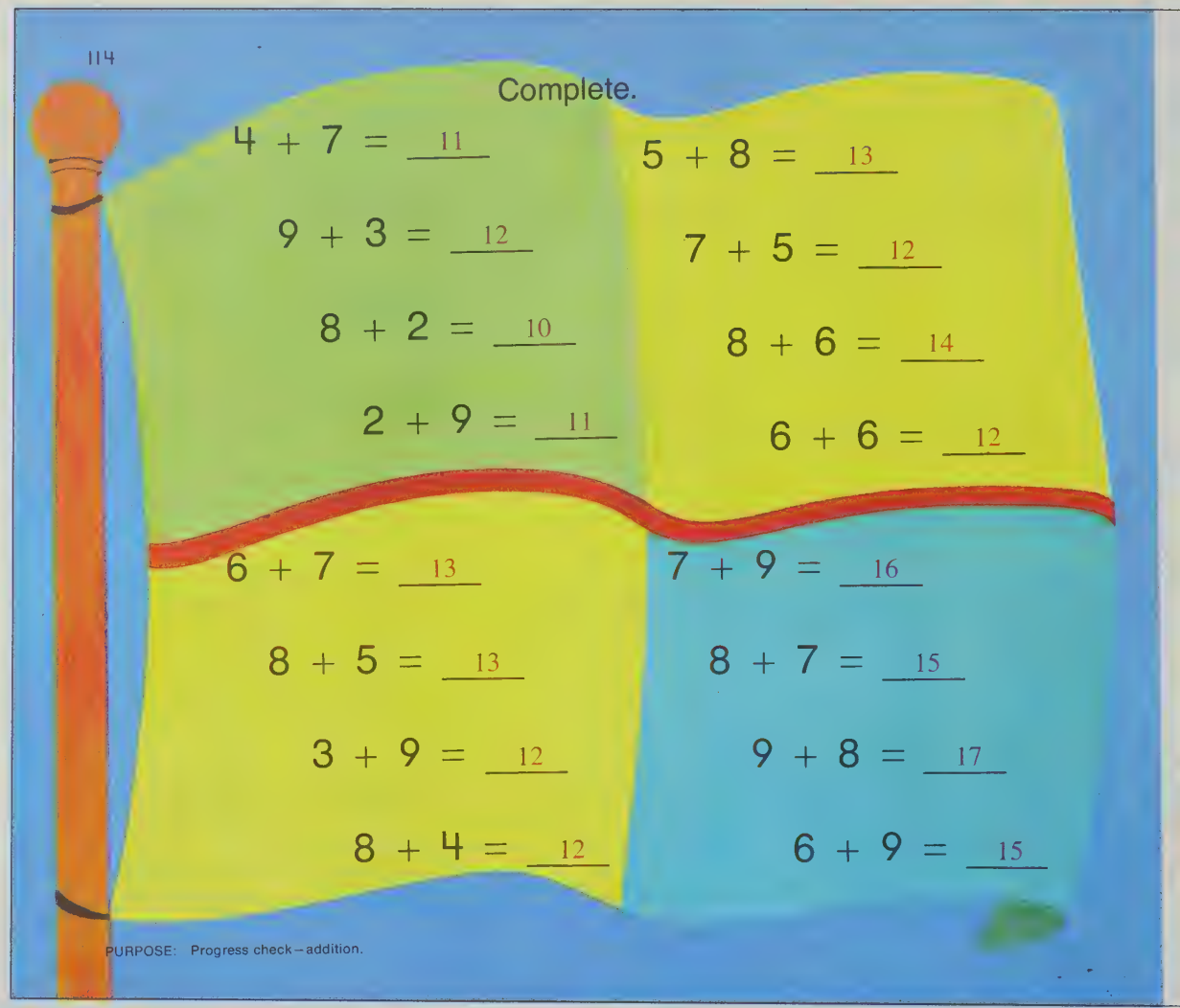
lesson Pages 114, 115

goal **Progress check** – addition with sums of 10 through 18

memo Be sure the children understand that they may use their counters whenever they wish. Allow ample time. There will be time to work on speed later. Those who finish quickly may go on to the next page.

page 114 Assign only three of the four parts – depending upon individual abilities. Do you have youngsters who are having trouble? Don't expect them to do the last box – rather, assign the other three. Pupils who have had no trouble need not waste their time on the first box. Assign the average and hard boxes. Make this a fun time. **Do not** mention testing.

easy facts 1, 2, 3, 4, 5 facts	**average difficulty**
average difficulty	**hard facts 6, 7, 8, 9 facts**

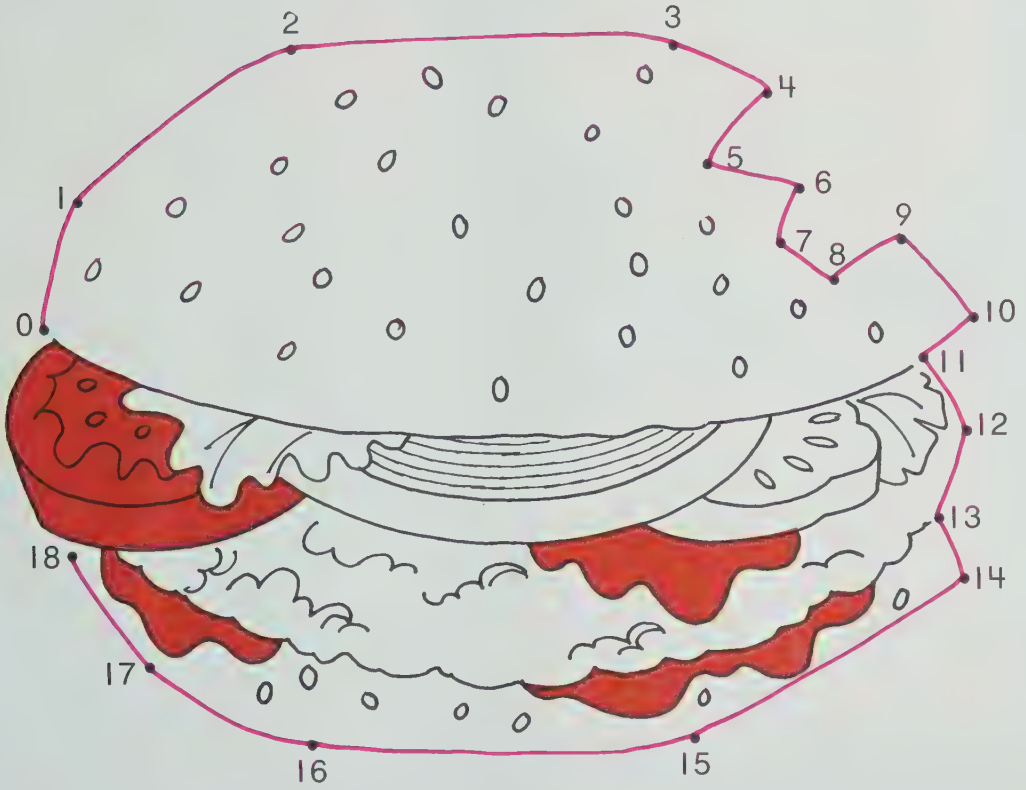


See activity 7, page 128b.

See activity 8, page 128b.

name _____

Start at 0. Connect the numbers in order.



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PURPOSE: Ordering numbers through eighteen.

goal Practice with order, 0 through 18

page 115 The children should do this page independently.

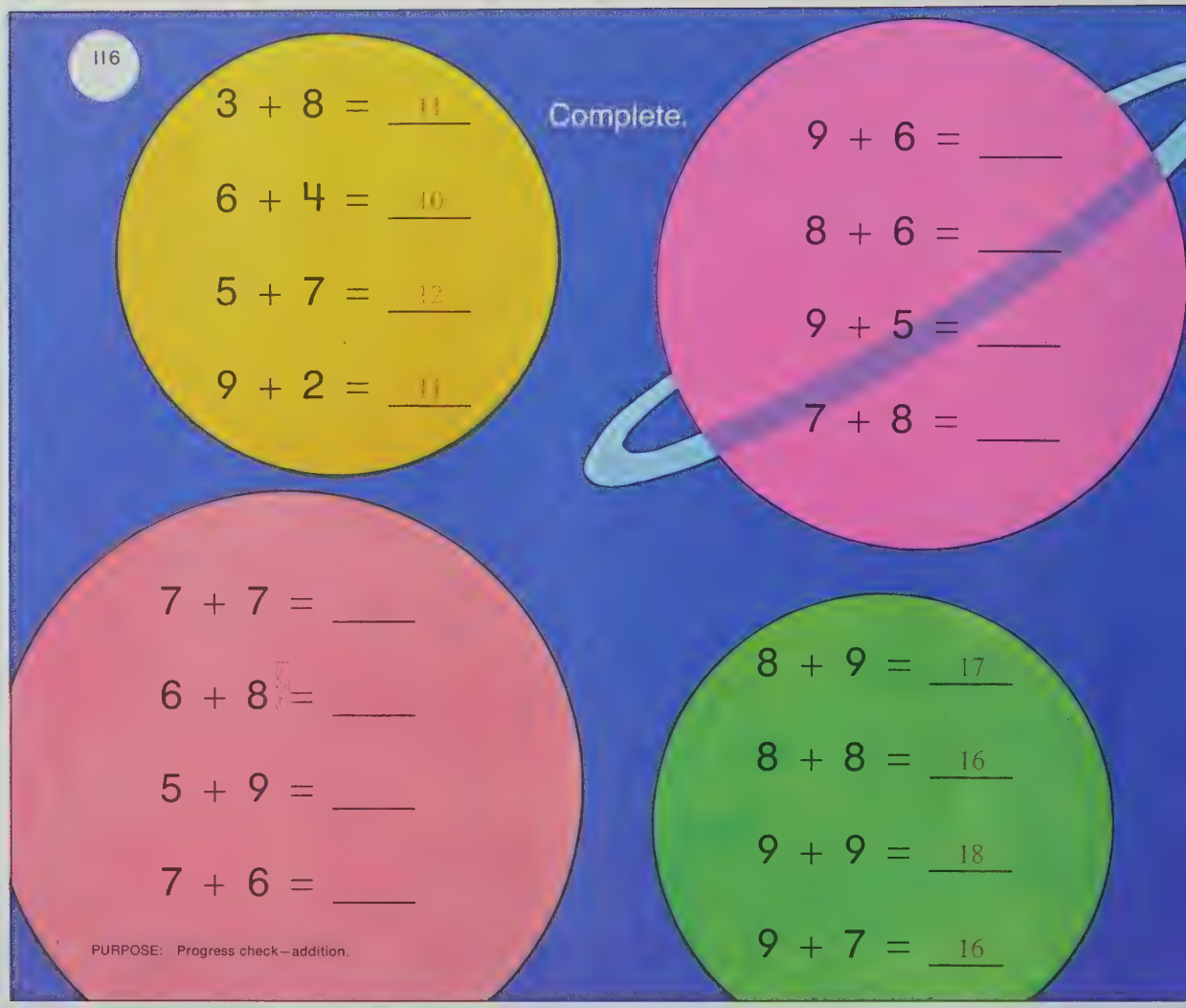
lesson Pages 116, 117

goal **Progress check** – addition with sums of 10 through 18

memo How well did the children do on page 114? You may wish to delay using this page with all the pupils until you do some of the activities suggested on pages 128a–128c.

page 116 Use the page as the basis for individual help for those pupils who are having trouble. Remember, you may want to use only three of the four parts, as suggested on page 114. Counters are O.K. Provide ample working time. The goal is to build a feeling of success.

Have the sharpies work on their own and continue to the next page when they are ready.

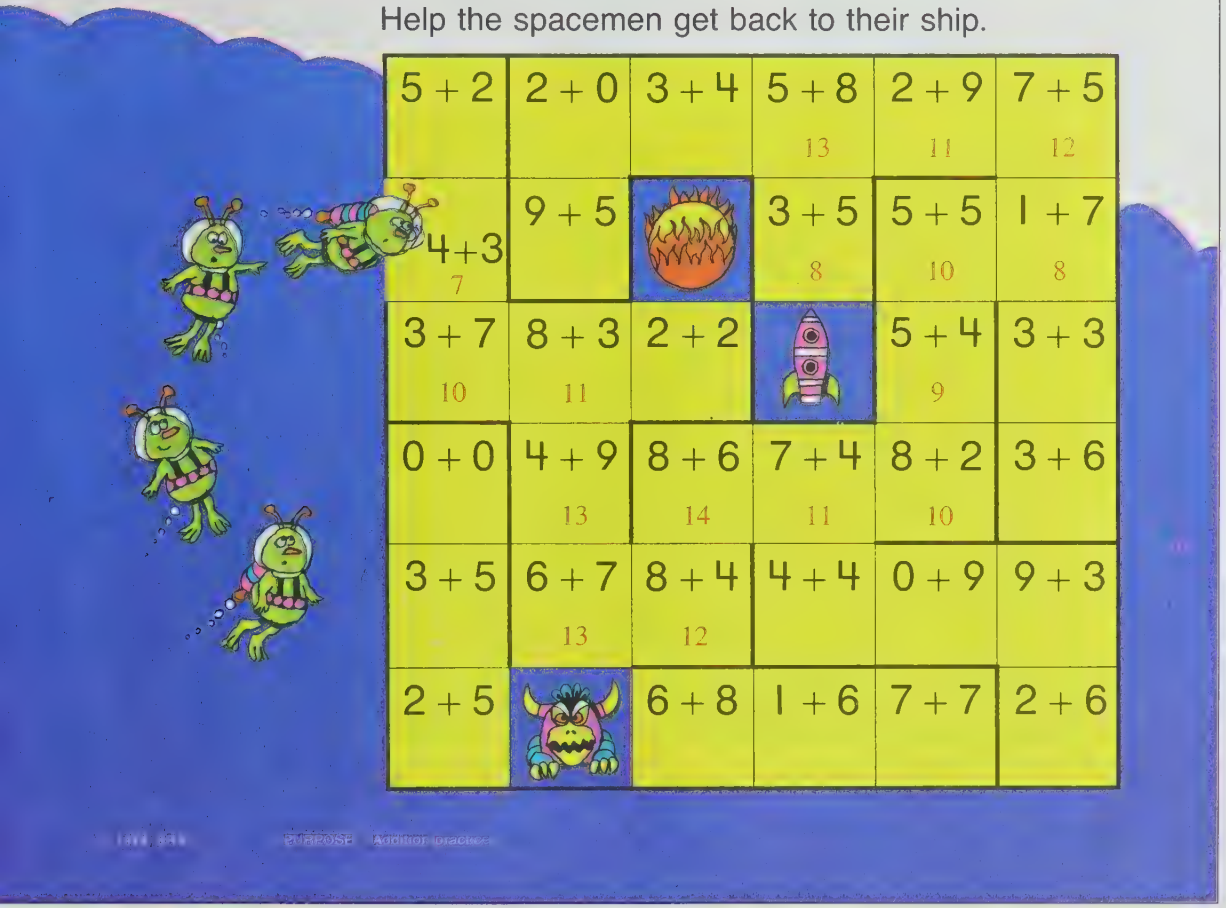


See activity 9, page 128b.

See activity 10, page 128c.

name _____

Help the spacemen get back to their ship.



goal Addition practice, sums of 0 through 14

warm-up The maze has grown since their last experience. You may wish to sketch one on the board. Focus only on finding the path.

page 117 With a crayon, the children should lightly trace their way through the maze. Then they work only those problems marked on the path.

How many SUMS *did you have to find to get the spacemen back to their ship?*

Those children who really want to finish the page may do so, but let this be their decision.

things flip cards (activity 2, page 128a), 3″ x 5″ index cards

Write a numeral on each strip, beginning with 10 and continuing through 18. Punch a hole at the top of each strip, arrange in order, and add to the 0 through 9 set. The children now find sums through 18.

lesson Pages 118, 119

goal Introduction to the vertical form for addition

things for each pupil:
+, =, and numeral cards

warm-up A bit of magic! With a few simple changes a number sentence can be rewritten into the vertical form for computation.

Erase the 3.
Write it over the 4.

$$3 + 4 = 7 \quad \rightarrow \quad \begin{array}{r} 3 \\ +\,4 \\ \hline 7 \end{array}$$

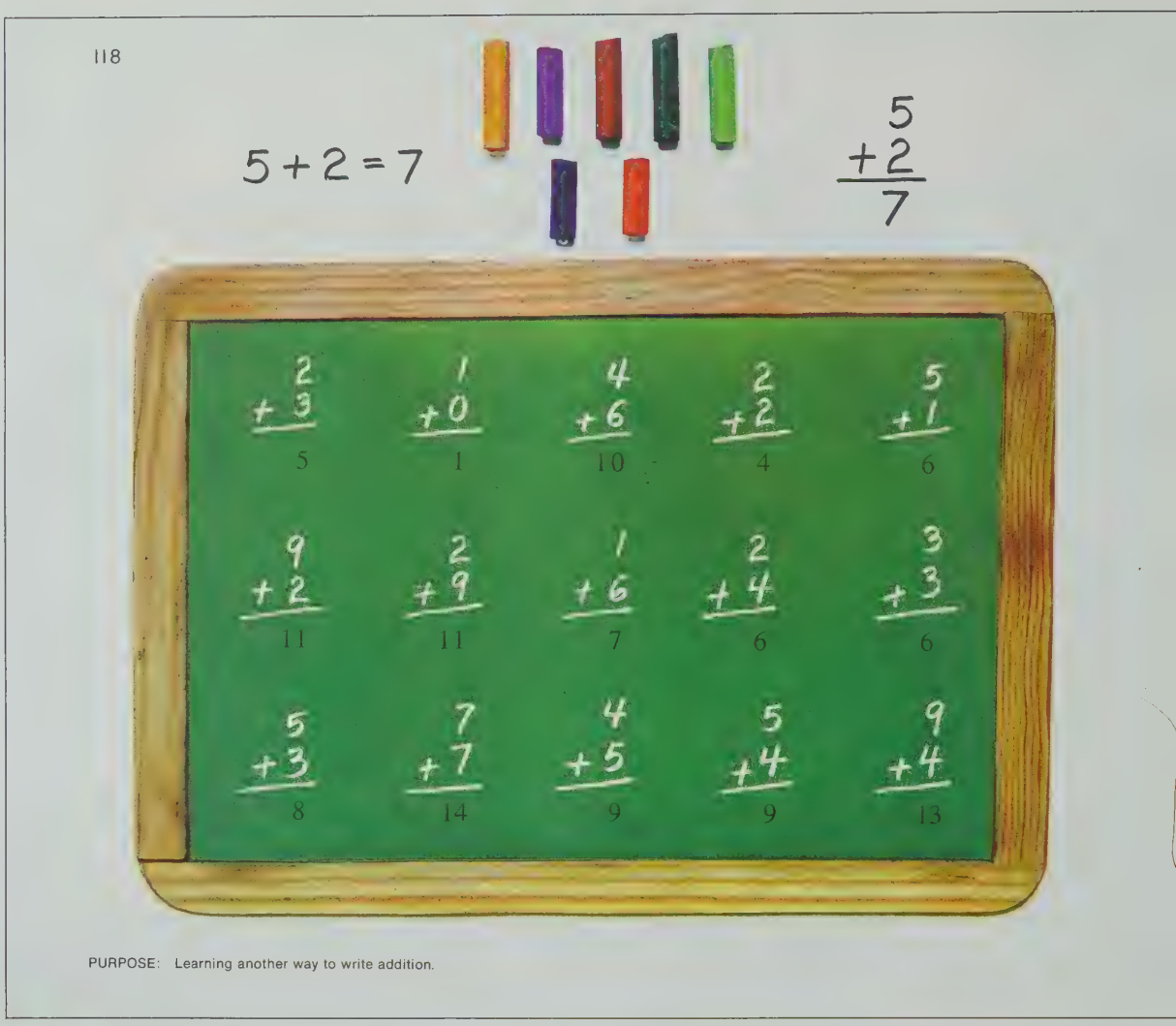
Erase the equals sign.
Make the line.
Finally, move the 7.

Pupils can repeat the action with their cards. Have them move the cards on a piece of paper so that they can make a line for the vertical form.

page 118 Compare the two ways of writing addition. *What's different about this page? Where is the 5? The + 2 didn't move. Where's the = ? What must the line mean? Where is the answer written?*

Do the first three problems together. The pupils can complete the page on their own. Check to see that they are writing the answers in the correct place.

That hard-problems list will be helpful again. *Which was the hardest? Why? Have we picked that problem before?*



PURPOSE: Learning another way to write addition.

STOP

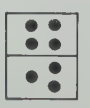
things dot cards (activity, page 77)

Place a card in a vertical position. Have the children write the matching problem.

$$\begin{array}{r} 3 \\ +\,4 \\ \hline 7 \end{array}$$

Turn the card.

$$\begin{array}{r} 4 \\ +\,3 \\ \hline 7 \end{array}$$



They write another problem.

name _____

Add

6 + 5 = 11	8 + 5 = 13	3 + 9 = 12	7 + 6 = 13	5 + 9 = 14
4 + 8 = 12	7 + 7 = 14	4 + 7 = 11	10 + 2 = 12	3 + 8 = 11
5 + 8 = 13	7 + 5 = 12	8 + 6 = 14	9 + 2 = 11	6 + 7 = 13
5 + 6 = 11	9 + 4 = 13			

There were 8 men in the store.
7 women were there too.

How many in all? 15

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PURPOSE: Practice with sums of eleven, twelve, thirteen, and fourteen.

goal Addition practice, sums of 11 through 14

things for each pupil: counters

warm-up Review facts for 11, 12, 13, and 14. Practice counting from the first number. Counters are still in style when needed.

page 119 Remind children to use counters when unsure. This is independent work. Help with reading the word problem.

After checking, arrive at a group decision: Which were the toughest problems? Why? Put them on the hard-problem list. Only practice will make them easy. Stop at various times throughout the day to point to the hard-problem list and ask for answers.

lesson Pages 120, 121

goal Addition practice, sums of 11 through 14

memo This is an extra-practice page. You may wish to save it for a later time—or skip it altogether. Use it with those children who need the practice.

page 120 Continue the use of counters with those who still need them. Let each child pick any two of the three rows to complete. Help with the reading if necessary.

Have each child ring four problems he missed or found difficult. Have him draw sets for each. Encourage individuals to start their own hard-problem list.

120

Add

2 + 9 = 11	5 + 7 = 12	6 + 8 = 14	7 + 4 = 11	8 + 3 = 11	4 + 8 = 12
9 + 3 = 12	9 + 5 = 14	7 + 5 = 12	8 + 6 = 14	8 + 5 = 13	8 + 4 = 12
9 + 0 = 9	5 + 8 = 13	7 + 6 = 13	4 + 9 = 13	5 + 9 = 14	3 + 8 = 11

He had 7.
He got 7 more.
How many in all?

14

She had 6.
She got 6 more.
How many in all?

12

PURPOSE: Practice with sums to fourteen.

name _____

How many fingers on one hand? Add that number to each of these.

4	9	6	5	8	3
+ 5	+ 5	+ 5	+ 5	+ 5	+ 5
9	14	11	10	13	8

What number is 1 less than 10? Add that number to each of these.

1	9	3	5	7	2
+ 9	+ 9	+ 9	+ 9	+ 9	+ 9
10	18	12	14	16	11

How many real dragons in your room? Add that number to each of these.

0	2	3	9	5
+ 0	+ 0	+ 0	+ 0	+ 0
0	2	3	9	5

© 1974, SRA PURPOSE: Addition practice.

goal Addition practice, sums of 0 through 18

page 121 A page to enjoy—no frustration from reading, please. Give as much help as necessary.

Have fun!

Have pupils write the numerals from 0 to 4 in a row. Pick a youngster and ask him to name a number that everyone will add to each of the written numbers. Ready, set, go! Repeat. This time have the numerals from 5 to 9 recorded and ask someone else to name the number to be added to each. Keep on as long as it is fun.

lesson Pages 122, 123

goal Review of addition, sums of 0 through 10

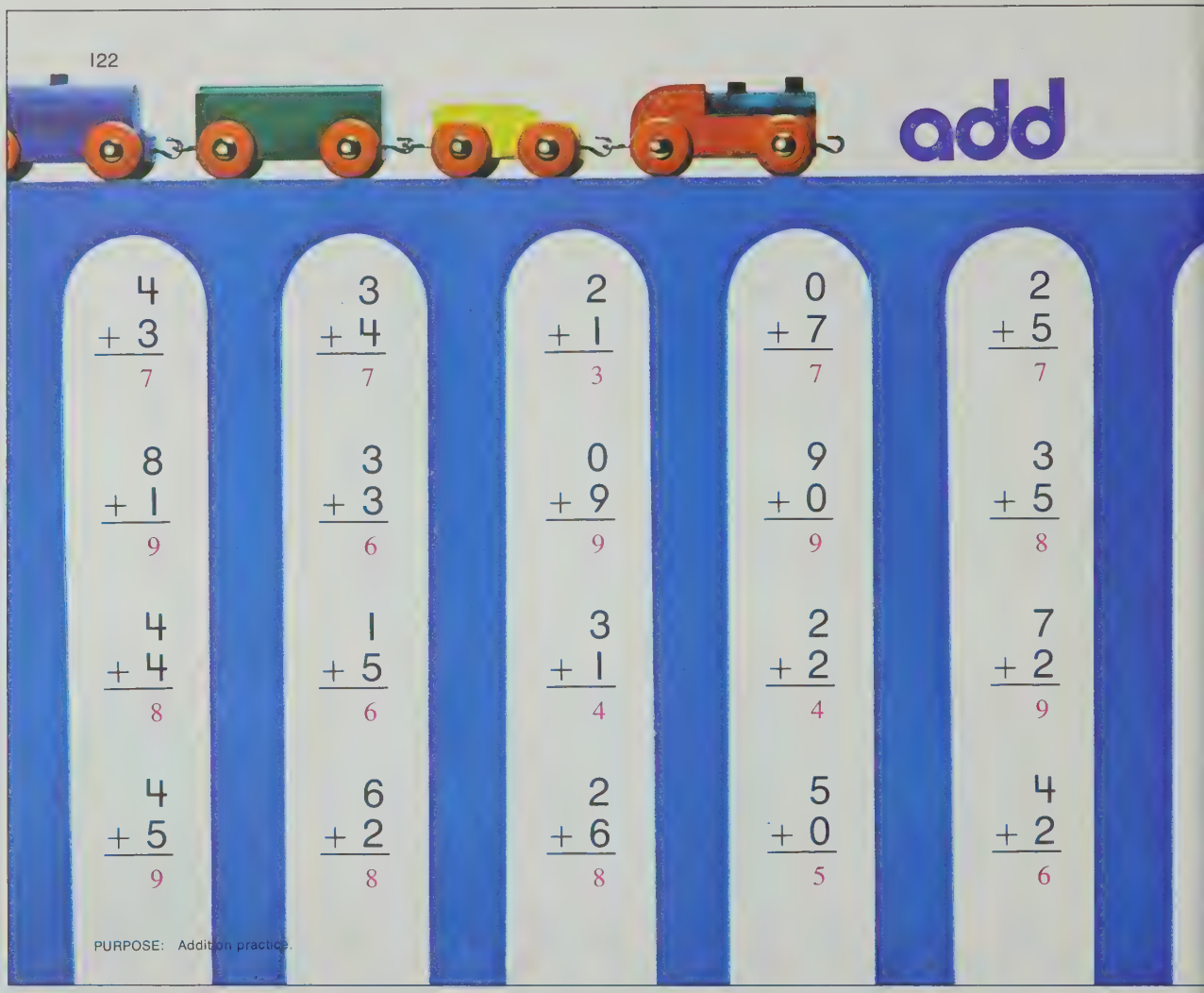
memo This page indicates the **minimal** addition skill acceptable for all pupils. A child who has trouble may not be counting correctly. Try to determine the reason for any mistakes.

things for each pupil:
numeral cards, 0 through 10

warm-up Orally review sums through 10—with or without counters—but don't let any child become frustrated. Pupils can tell the sum by showing a numeral card. This keeps everyone involved.

page 122 Try this page without counters. Use them only in an emergency.

Try to diagnose skills with anyone who had trouble. Can the child count to 18? Does he understand the operation of addition? Can he handle the facts through 5? through 9? Can he find how many in all when shown a set of five and a set of two? a set of two and a set of seven?

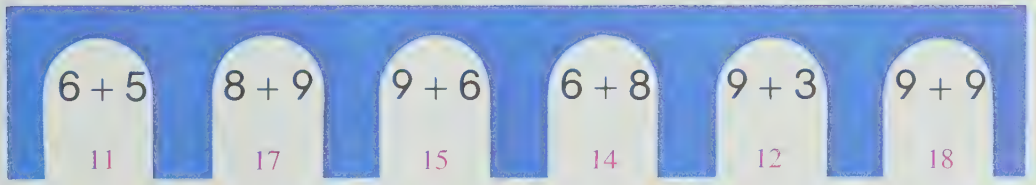


name _____

+	0	1	2	3	4	5	6	7	8	9
0	0	1	2	3	4	5	6	7	8	9

+	0	1	2	3	4	5	6	7	8	9
1	1	2	3	4	5	6	7	8	9	10

Find the sums. Then decode.



Y O U W I N

CODE 10 = a 11 = y 12 = i 13 = e

14 = w 15 = u 16 = s 17 = o 18 = n

© 1974, SRA PURPOSE: Addition practice.

goal Addition practice, sums of 11 through 18

page 123 Here are a few tricks to liven up the practice. This is the first time the pupils have been asked to do any mental calculation. Even though the problems are simple, you may have to show the complete problem to get them started.

0	1	2	3
+0	+0	+0	+0 . . .

Fill in the first two boxes together. When the top two grids are finished, take time out to look for patterns. *What happens when zero is added to a number? What happens when one is added to a number?*

Now focus on **decode** and **code.** Be a ham. Be very secretive as you talk about the directions. *Has anyone ever heard of a secret code? What is it?*

Work the first problem together. Record the answer. Find that number in the code list and write its letter on the line below the answer. Let them finish the page.

Shhh! *Keep the secret.*

lesson Page 124

goal **Checkout**—addition with sums of 11 through 18

things for each pupil:
numeral cards, 10 through 18
crayons

warm-up Review the following orally.

8 + 9	8 + 5	9 + 9	9 + 5
8 + 8	8 + 4	9 + 8	9 + 4
8 + 7	8 + 3	9 + 7	9 + 3
8 + 6	8 + 2	9 + 6	9 + 2

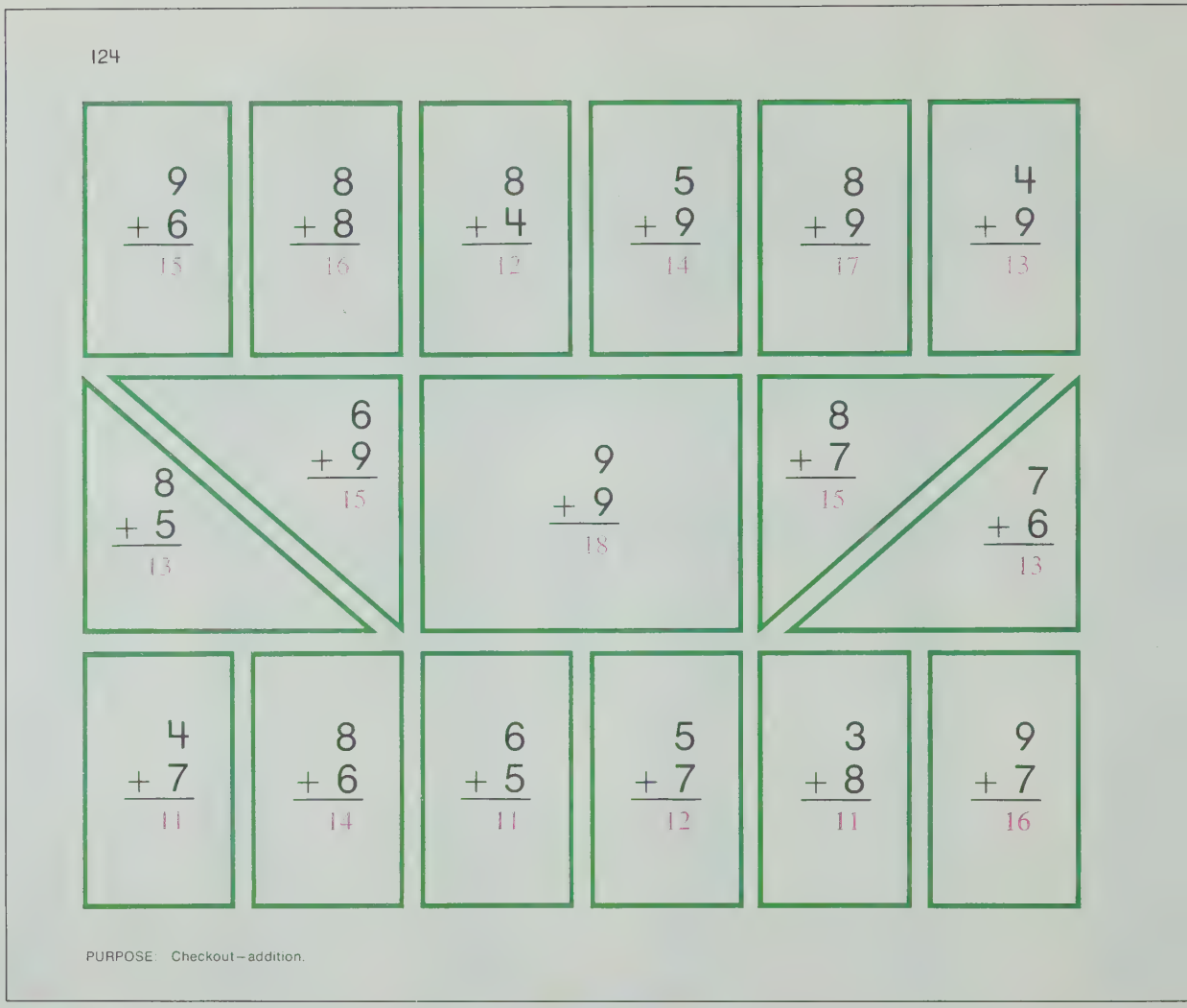
Answers can be shown with numeral cards.

page 124 Permit counters for those who still need them. Provide enough time—**don't push for speed.**

Write the following code on the board:

18—white	14—purple
17—yellow	13—orange
16—green	12—red
15—blue	11—black

Can you guess what to do? When you finish, follow this code. Color very lightly so that your sums still show.



See activity 11, page 128c.

things cards from boxes for 11 through 14

Game: 2 to 4 players. Mix up the cards. Turn them facedown. One player picks a card and turns it faceup. The first player to give the correct answer keeps the card. The one with the most cards wins.

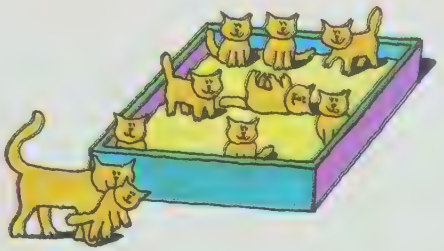
name _____

He put 4 in a box.
He added 1 more.
Then he got 2 more.
How many in all?

$$\begin{array}{r} 4 \\ 1 \\ +\ 2 \\ \hline ? \end{array} \qquad \begin{array}{r} 5 \\ +\ 2 \\ \hline 7 \end{array}$$

She put 3 in the box.
She added 5 more.
Then she got 1 more.
How many in all?

$$\begin{array}{r} 3 \\ 5 \\ +\ 1 \\ \hline ? \end{array} \qquad \begin{array}{r} 8 \\ +\ 1 \\ \hline 9 \end{array}$$



She had 6.
There were 2 in the box.
And 4 more too.
How many in all?

$$\begin{array}{r} 6 \\ 2 \\ +\ 4 \\ \hline ? \end{array} \qquad \begin{array}{r} 6 \\ +\ 6 \\ \hline 12 \end{array}$$

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PURPOSE: Introduction to addition of three numbers.

lesson Pages 125, 126

goal Introduction to addition of three addends

memo The children will be working with the associative property. Once again, it would be marvelous if they would discover the advantage of the property—no need for technical words.

things 10 objects

warm-up Form three sets—one with 3 objects, one with 5, one with 2.

How many in the first set? the second set? the third set? I wonder how many in all.

When someone comes up with an answer, ask **how** he did it. That's a lot of numbers! Try more examples with sums less than 12. Use the children—2 girls, 4 boys, 3 girls. How many all together? Move the first two sets together. How many? Add. How many in all?

page 125 A **do-together** page. Help with reading if necessary.

Which two numbers are GROUPED *together in the first problem? The color shows that they are grouped.*

goal Introduction to parentheses to show grouping

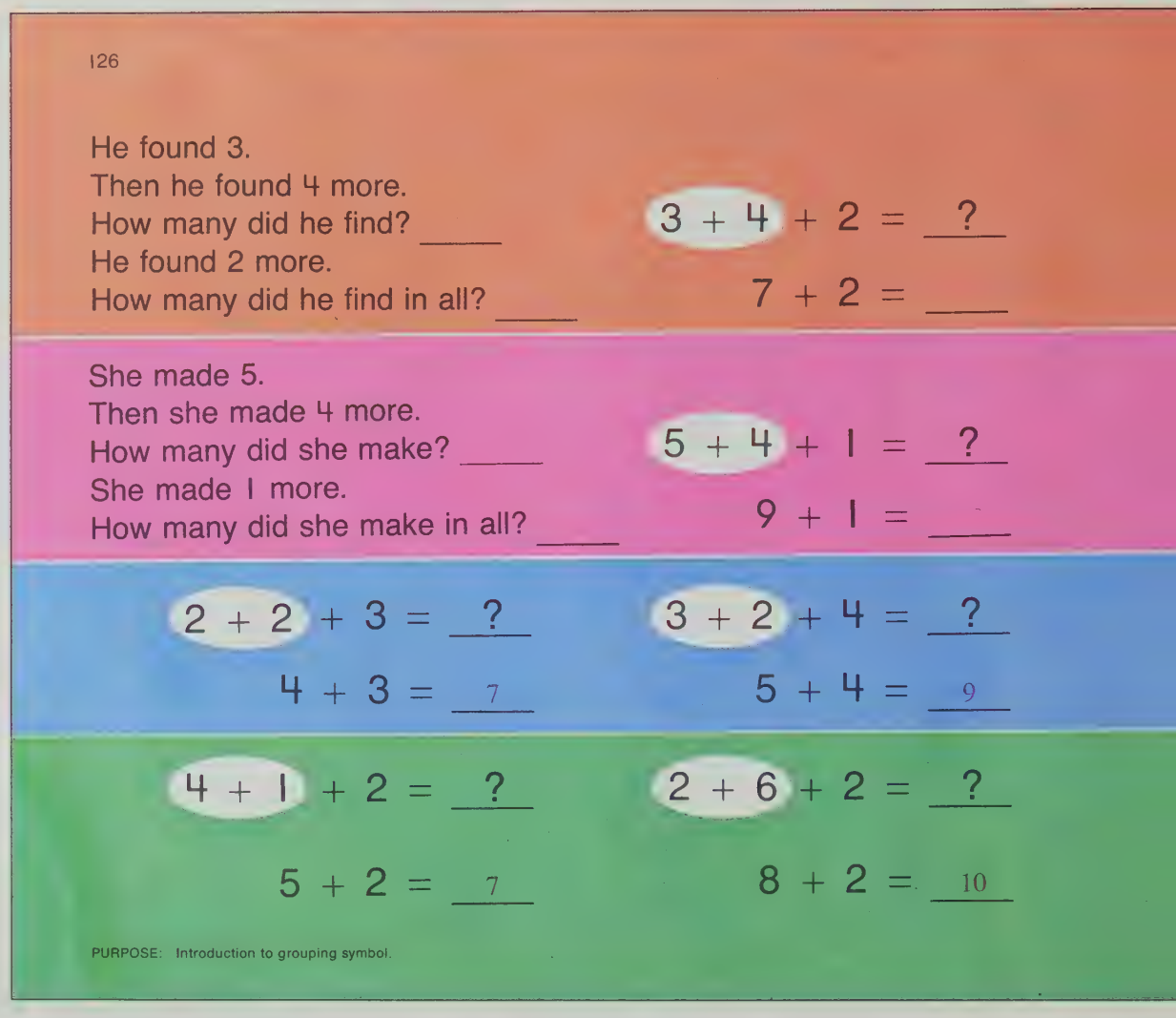
page 126 Read the first problem together. Write the sentences on the board as you proceed. Rather than color, use a ring to show which numbers are grouped together.

Are you ready for more magic? My eraser will help me make a new MATH SYMBOL.

Erase the top and bottom of the ring around 3 + 4, leaving only parentheses. Use the word **parentheses** with the children if you wish. We're calling it the GROUPING SYMBOL.

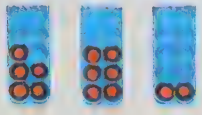
Can anyone guess what these funny symbols might tell us to do? They tell us which numbers to group first. Make the symbols on your page. The color outline should help the children.

Help with reading the second problem. Again have them put in the grouping symbols. Remind them that the symbols tell which two numbers to add first. Children can work independently as soon as they feel secure.


126
He found 3.
Then he found 4 more.
How many did he find? ____
He found 2 more.
How many did he find in all? ____
3 + 4 + 2 = ?
7 + 2 = ____
She made 5.
Then she made 4 more.
How many did she make? ____
She made 1 more.
How many did she make in all? ____
5 + 4 + 1 = ?
9 + 1 = ____
2 + 2 + 3 = ?
4 + 3 = 7
3 + 2 + 4 = ?
5 + 4 = 9
4 + 1 + 2 = ?
5 + 2 = 7
2 + 6 + 2 = ?
8 + 2 = 10
PURPOSE: Introduction to grouping symbol.

name _____

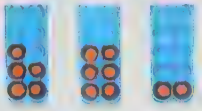
Add.



5 + 6 + 2

(5 + 6) + 2 = 11 + 2, or 13

You could add in another order.



5 + 6 + 2

5 + (6 + 2) = 5 + 8, or 13

THE ANSWER IS THE SAME.

Try these.

6 + (7 + 3)

6 + = 16

(5 + 5) + 6

+ 6 = 16

6 + (8 + 2)

6 +

= 16

7 + (4 + 5)

7 + = 16

8 + (5 + 3)

8 + = 16

(4 + 7) + 5

+ 5 = 16

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PURPOSE: Practice in adding three numbers.

lesson Pages 127, 128

goal Practice in adding three addends

warm-up Do some people-grouping again. Pick 3 boys from the right side of the room. Add 2 girls from the right side of the room. Then add 1 girl from the left side of the room. $(3 + 2) + 1 = \underline{?}$

↓ from the right side

↓ from the left side

How many in all?

Bring the girls together. $3 + (2 + 1) = \underline{?}$

↓ boys

↓ girls

How many in all?

Express amazement that you grouped the people differently and yet you still have the same number in all. *Do you suppose that will be true when we add other numbers?*

page 127 The top of the page is another situation to investigate. Demonstrate with actual ten-trays and counters if there is any confusion. Let those who are able finish the page independently.

After correcting, write each equation on the board—one at a time. Ask for another way to use the grouping symbol. Find the sum. Is the sum the same as it is on the page? What does this mean?

goal Practice in adding three addends

page 128 *These are strange apples! They have numbers in them.*

Discuss directions. Investigate to see if it makes any difference which two numbers you add together first. You may need to write the problems on the chalkboard. Then these are independent work. Give all the help necessary for reading the word problems.

Add. Put the answer in the middle.

There were 3 green ones,
5 red ones,
and 1 blue one.
There were ___ in all.

There were 4 purple ones,
1 orange one,
and 3 brown ones.
There were ___ in all.

There were 5 black ones,
2 white ones,
and 2 pink ones.
There were ___ in all.

PURPOSE: Practice in adding three numbers.

things 3 dice, paper cup

Each player shakes the cup containing the 3 dice and rolls them out. He finds the sum of the 3 top numbers by counting from the number of dots on the first die. The sum is the player's score. High score wins.

things paper cup, 2 cubes with sides numbered 1 through 6, 1 cube marked with 7, 7, 8, 8, 9, 9

Same rules as for the preceding activity. Challenge these children to add the 3 numbers without counting. Cubes may be moved to form pairs of numbers that are easier to add.

RESOURCES

another form of evaluation

for progress check—page 79

You will need 25 counters.

Do a finger-play activity. You use one hand. The pupil uses one hand. He holds up some fingers. You hold up some. He tells you how many in all. Give him a counter for every right answer. After he has won 10 counters, let him use both hands to show his number. Remember to keep the sums less than 10. If he earns all 25 counters, give him a special prize. (Maybe he can pick the job he wants most to do as a helper next week.)

for progress check—page 93

The pupil will need his numeral cards. You will need two more sets of cards along with a big plus symbol.

Put the plus symbol on the table. The pupil puts down a numeral card on one side of the plus symbol; you put down a numeral card on the other side. He tells the sum. If his answer is right, he gets to keep your card. If he is wrong, you get to take it back so that you can play it again. He can replay any card he has. The goal is for him to win all your cards. Watch out, because the sums are still limited to 10 and you can't get caught with the 7, 8, and 9 cards left in your hand.

Jot down the combinations the pupil misses so that he can have his own personal study sheet when you finish.

for progress check—pages 114 and 116

You will need 2 one-inch-wide strips of heavy paper at least 11 inches long. Put the numerals 0 through 9 equally spaced on both of the strips. Put one strip above the other. Have the pupil cup his hands so that he can see only one numeral on each strip. Guess what? That is the addition fact that he will complete. He will keep his hands in the same place, but you will move the strips so that a new addition fact shows. You will both have fun with this.

If you want to check only the harder facts, just make another strip. Instead of writing all the numerals on the strip, write two of each of the numerals 5 through 9.

for checkout—page 124

You may want to make a spirit master for this activity so that you can use if for practice at a later time.

Write the numeral 6 ten times in one row. Leave vertical space for the pupil to write another numeral and still more space for what will be the answer to an addition combination. Do a row of 7s, a row of 8s, and a row of 9s.

Make this a two-day job. The first day the pupil should figure out if he can add a different number to each of the 6s. Could he add the same numbers he just wrote to each of the other rows of numbers? He should get his addition sheet ready this first day.

On the second day he should complete the sheet. If you think that this is still too much work for one day, why not let him do any 18 he wants to do first and then finish on still another day?

activities

1. things for each pupil: counters, +, =, numeral cards

Have children form sets and sentences as you read this story.

Charlie is my best friend. But sometimes I just don't understand Charlie. Last week—it was on a Monday, I think—he told me he ate 6 tigers and 2 elephants. [Children display a set of 6 and a set of 2.] Could you eat 6 tigers and 2 elephants? How many would that be? [Children form sentence with cards and read.]

I told you Charlie was my best friend, so I couldn't tell him that he was silly. I just smiled and asked, "Then what happened, Charlie?" He looked kind of sad and said, "Well, I was still very, very hungry. You see, I'd been riding my bike, and you know how hungry that makes you. So I ate 5 bears and 4 lions." [Children display a set of 5 and a set of 4.] Could you eat 5 bears and 4 lions? How many would that be? [Children form sentence and read.]

I told you Charlie was my best friend, didn't I? So I looked very, very carefully at Charlie. He just looked sad, that's all—just sad!

"Then," Charlie said, "I couldn't stop, so I ate 3 zebras and 4 monkeys." [Children display a set of 3 and a set of 4.] Could you eat 3 zebras and 4 monkeys? How many would that be? [Children form sentence and read.]

I said to my best friend, "Charlie, that makes me feel just awful!" And Charlie said, "That makes you feel awful! If you really want to feel awful, just eat a whole box of animal cookies like I did—all those elephants and tigers and everything else!"

My friend Charlie is O.K. He didn't eat real animals. He ate ____ ____.

2. things 3″ x 5″ index cards
ring fastener

Make strips by cutting index cards into fourths vertically. Write one of the numerals from 0 through 9 on each strip. Punch a hole at the top of each strip; arrange the strips in order beginning with 0; put a ring through the holes so that the cards can be flipped.

To find the sum for 3 + 5, the child counts each **strip** (not the numerals) as he flips it

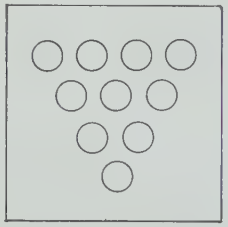
until he has counted **three strips**. The numeral 3 now faces him. He then counts and flips **five more strips**—1, 2, 3, 4, 5. Now the numeral 8 faces him—the sum for 3 + 5.

Hang on to these. You'll be adding 10 to 18 a little later. And they will also be used to compute answers for subtraction.

3. things 2 wood cubes, counters

Mark each face of each cube with one of the numerals 0, 1, 2, 3, 4, or 5. Dice game: 2 to 6 children play and take turns rolling the dice. The players each write the addition sentence for the 2 numbers that land faceup. The roller checks and gives a counter to each person who writes the correct sentence. The person with the most counters wins.

4. things 10 bowling pins, ball, cardboard

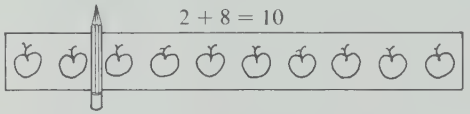


Make a pin setup chart on cardboard. Put the pins on the chart. Rules: A player rolls the ball. He writes a sentence for the number of pins knocked down plus the number left up.

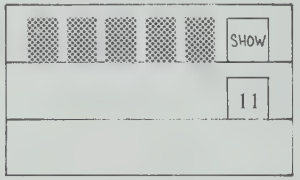
Variation: A player rolls the ball once, records the number of pins down, and removes them. He then rolls the ball again. The number of pins down are recorded and added to the previous number for his score.

5. things for each pupil: long narrow strips of oaktag, crayons or 10 gummed stickers

Have the children make a set of ten. Direct them to leave a one-finger space each time before making the next thing. They can now use a pencil to separate the set into 2 sets and show the addition names for ten.



6. things pocket chart, 1 x 3 strips—2 colors, word card for **Show,** large numeral card for 11



Place 5 strips of one color in the top row. Have a child count how many. Then counting from 5, have him put strips of another color in the second row until he has 11 in all.

What sentence can we write? (5 + 6 = 11) *Let's find another way to show 11.* Vary the activity by changing the number to be shown.

7. things target, 2 beanbags

Make a target and tape it to the floor. Each child throws 2 beanbags. He adds together the numbers the beanbags land on. The sum is his score. At the end of a round, the child with the highest score wins.

1	2	3
8	9	4
7	6	5

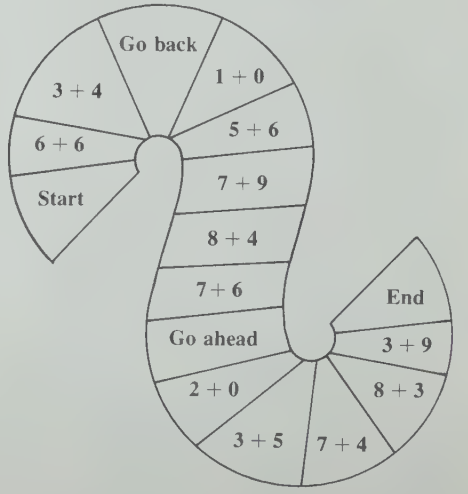
8. things deck of playing cards (number cards only)

(Small-group activity) Each player is dealt 5 cards. He places these faceup in front of him. The remaining cards are placed facedown to form the drawing pile. The top card is turned faceup to start the discard pile.

At his turn a player takes a card from either pile, exchanges it with one of his cards (if he wishes) and discards 1 card. Objective: to get and arrange 5 cards in consecutive order from least to greatest. This order can be reversed as a variation.

9. things for each group: game board, cube with sides numbered 1 through 6, different counter for each player

The cube is rolled to find the number of spaces to move. A correct answer allows the player to leave his counter in the space. An incorrect answer means he moves his counter back to its previous position. A player follows any special instructions. You can vary the game boards to match the abilities of your pupils.



10. things for each pair: counters—2 colors, numeral cards 1 through 18, cube numbered 0 through 5, cube numbered 4 through 9

The numeral cards are laid down in order from left to right. Each child uses counters of one color. The first player rolls the cubes and adds the 2 numbers that land faceup. If his sum is correct, he places a counter under the numeral card that tells how many. The turn passes to the second player. The player with more counters under the cards wins. Which number was used as an answer most often?

11. things for each pupil: counters—2 colors

Some children lack number sense. Early signs of this problem can be found when you are working with the harder addition facts. Focus on this sequence of problems with those who don't really understand what combination of numbers will yield a sum greater than 10.

4	4	5	6	6	7	7	8	8
+4	+5	+5	+5	+6	+6	+7	+7	+8

Show 8 with counters all of the same color. Show 6 with counters of another color. Is there a 5 in the set of eight? Show it. Is there a 5 in the set of six? Show it. Put the two sets of five together. How many? And how many more?

Use the same procedure for the remaining examples. Do the youngsters see a pattern?

additional learning aids

concept— chapter objectives 1, 3, and 5

SRA products

Inquisitive Games: Exploring Number and Space, SRA (1967)
Buy and Sell Game 1 (Use only "buy" activities.)
Mathematics Involvement Program, SRA (1971)
Cards: 101, 131, 151, 181, 201, 241, 301, 32, 52, 72, 82, 102, 132, 142, 152
Skill through Patterns, level 1, SRA (1974)
Spirit masters: 7, 8, 9, 18, 19, 24
Visual Approach to Mathematics, level 1, SRA (1967)
Visuals: 2, 3, 4, 5, 6, 7, 8, 9, 10, third, fourth, and fifth suggested activities
Visual: 13, first suggested activity

other learning aids (described on page 128d)—Abacus Board, Arithmetic Tube, Balance scale, Cuisenaire Rods, Hainstock Blocks, Keyboard Counter

notation— chapter objectives 2, 4, and 7

SRA products

Skill through Patterns, level 1, SRA (1974)
Spirit masters: 15, 22, 23

other learning aids— Magic slates

operation—

chapter objectives 6 and 8

SRA products

Computapes, SRA (1972)
Module 1, Lessons: AS 1, 2, 3, 4, 9
Skill through Patterns, level 1, SRA (1974)
Spirit masters: 10, 11, 12, 13, 14, 16, 17, 20, 21, 25, 45, 46, 47, 48
Visual Approach to Mathematics, level 1, SRA (1967)
Visuals: 12, 21

other learning aids— 1 Win (set 1), Mathfacts Games* (addition, subtraction—levels 1 and 2), Mini Veri-Tech, Orbiting the Earth (addition)

*Trademark of Milton Bradley Co.

letter to parents

Dear Parents,

By now your child should be feeling very smart! He can find page 16 for you in a newspaper (or page 9, or any numbered page up to 18). And now it is O.K. for him to make a set of addition flash cards to use at home. Recipe cards are just the right size, but any pieces of sturdy paper will do. The addition combination should go on the front of the card, and the answer on the back. Don't try to get the whole job done at once. Add five or ten combinations to the set every night. Practice the most on the combinations your child doesn't know.

Take ten cards. Put one of these combinations on each card.

0	1	2	3	4	5	6	7	8	9
+0	+0	+0	+0	+0	+0	+0	+0	+0	+0

Ten more cards are needed for the combinations with 1.

0	1	2	3	4	5	6	7	8	9
+1	+1	+1	+1	+1	+1	+1	+1	+1	+1

Make ten more for 2.

0	1	2	3	4	5	6	7	8	9
+2	+2	+2	+2	+2	+2	+2	+2	+2	+2

And so on—until there are cards up to the combinations with 9. By the end of the year your child should know all the combinations. Work at home from time to time will help a great deal.

We will be studying the clock next week. The goal is to tell time to the hour. By talking about what the clock says, you'll help make your child aware that telling time is important. For now, all that's necessary is to look at the position of the hands when the clock says bedtime, or mealtime, or time to get up.

We are making good progress, thanks to your cooperation.

Other Learning Aids

whole-number concepts

Arithmetic Tube Ideal
Demonstrates sets of from 1 through 9 counters; addition and subtraction facts

Counting Blocks Ideal
Multicolored one-inch wood cubes used for counters

Counting Chips Creative Publications
Plastic disks of eight colors to use in counting and sorting activities and in work with place value and simple computation

Counting Rods Ideal
Wood rods of ten proportioned lengths and a tray useful for activities such as building a number-step pattern, developing equivalent lengths, and comparing lengths

Cuisenaire Rods Cuisenaire
Rods of ten colors and ten proportioned sizes to model patterns and number relationships

Hainstock Blocks Creative Publications
Ten blocks, one for each numeral 0 through 9 corresponding to the Cuisenaire colors, to illustrate all addition combinations having a 1-digit sum

Keyboard Counter Creative Publications
Two sets of ten flip-up keys to illustrate sentences in addition and subtraction and groupings

Lots-A-Links Creative Publications
Plastic links for grouping and counting activities

Match It Game Singer-SVE
A board game designed to provide practice in numeral recognition and to reinforce number sequence

Number Sorter Sigma Scientific
A pegboard with a given number of pegs for each number 1 through 5 for matching a set of squares with holes that correspond to the peg groups

100 Number Board Dick Blick
A marked grid board and 100 numbered plastic tablets for counting and ordering

Two-Place Number Board Ideal
Wood disks to show ones and grooved wood pillars to show the value of ten disks

Unifix (Cubes and Components)
Available from several sources, plastic interlocking cubes and component parts for number recognition, counting, numeration, and whole-number operations

whole number notation

Beginners Number Milton Bradley
Poster Cards
Giant-size posters showing realistic and semiabstract objects, numerals, numeral words, and combinations of money

Magic Slates
Available from several sources, individual slates for numeral-writing practice; made reusable by simply pulling up the plastic sheet

Matchmates Sigma Scientific
Ten pairs of interlocking wood pieces that fit together when a set picture and a numeral are matched

Math Bingo Sigma Scientific
Game cards to practice recognition of the numerals 1 through 10 and geometric shapes and to develop vocabulary

Numberite (Deluxe) General Learning
Notched boards with flocked numerals and numeral words that fit together only when properly sequenced from 0 to 10 for a kinesthetic approach to numeral writing

Stepping Stones Instructo
Rubber mats, one-foot square, each with a numeral 1 through 20

whole number operations

Abacus Board Creative Publications
Board with pegs for learning the concepts of addition and subtraction

I Win Scott, Foresman
Phrase cards to pair with answer cards for addition and subtraction practice
Set 1—sums to 12
Set 2—sums to 18

Make and Take Game Singer-SVE
A board game to provide practice with addition and subtraction facts (sums through 9)

Mathfacts Games Milton Bradley
Practice with the basic addition and subtraction number facts
Level 1—addition, sums less than 10
Level 2—subtraction, related to above
Level 3—addition, sums 10 through 18
Level 4—subtraction, related to above

Mini Veri-Tech ETA
A twelve-title minicomputer and problem books in game form to provide self-corrective practice with the basic facts

Orbiting the Earth Scott, Foresman
(addition and subtraction)
Players to toss numeral blocks and state basic facts correctly to move markers about on a playing field

Quizmo (add-subtract) Milton Bradley
A lotto-type game for practice with addition and subtraction facts

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TABLES OF MEASURE

LENGTH

CUSTOMARY	METRIC
12 inches (in.) = 1 foot	10 millimetres (mm) = 1 centimetre
3 feet (ft.) = 1 yard	10 centimetres (cm) = 1 decimetre
1760 yards (yd.) = 1 mile	10 decimetres (dm) = 1 metre
	10 metres (m) = 1 dekametre
	10 dekametres (dkm) = 1 hectometre
	10 hectometres (hm) = 1 kilometre (km)

AREA

CUSTOMARY	METRIC
144 square inches (sq. in.) = 1 square foot	100 square millimetres (sq. mm) = 1 square centimetre
9 square feet (sq. ft.) = 1 square yard	10,000 square centimetres (sq. cm) = 1 square metre
4840 square yards (sq. yd.) = 1 acre	100 square metres (sq. m) = 1 are
640 acres = 1 square mile	100 square ares (a) = 1 hectare
1 square mile (sq. mi.) = 1 section (of land)	100 hectares (ha) = 1 square kilometre (sq. km)
36 sections = 1 township	

WEIGHT

CUSTOMARY	METRIC
16 drams (dr.) = 1 ounce	10 milligrams (mg) = 1 centigram
16 ounces (oz.) = 1 pound	10 centigrams (cg) = 1 decigram
2000 pounds (lb.) = 1 ton (tn.)	10 decigrams (dg) = 1 gram
	10 grams (g) = 1 dekagram
	10 dekagrams (dkg) = 1 hectogram
	10 hectograms (hg) = 1 kilogram
	1000 kilograms (kg) = 1 metric ton (t)

VOLUME

CUSTOMARY	METRIC
1728 cubic inches (cu. in.) = 1 cubic foot	1000 cubic millimetres (cu. mm) = 1 cubic centimetre
27 cubic feet (cu. ft.) = 1 cubic yard (cu. yd.)	1000 cubic centimetres (cu. cm) = 1 cubic decimetre
	1000 cubic decimetres (cu. dm) = 1 cubic metre (cu. m)

CAPACITY

Liquid

2 cups (c.) = 1 pint
2 pints (pt.) = 1 quart
4 quarts (qt.) = 1 gallon (gal.)

Dry

2 pints (pt.) = 1 quart
8 quarts (qt.) = 1 peck
4 pecks (pk.) = 1 bushel (bu.)

Liquid and Dry

10 millilitres (ml) = 1 centilitre
10 centilitres (cl) = 1 decilitre
10 decilitres (dl) = 1 litre
10 litres (l) = 1 dekalitre
10 dekalitres (dkl) = 1 hectolitre
10 hectolitres (hl) = 1 kilolitre

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